Vol. LVIII JANUARY, 1921 New Series Vol. II, No. 4

JOURNAL

of the

American Veterinary Medical Association

FORMERLY

AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

CONTENTS

Editorial 373

Papers:

Veterinary Education and Its Readjustment—C. D. McGilvray 378

The Presence of Micro-Particles in the Blood and Other Body Fluids—S. H. Gage and P. A. Fish 384

The Susceptibility of Young Pigs to Hog Cholera—E. M. Pickens, M. F. Welsh and L. J. Poelma 403

Protozoan Forms and Their Relation to Diarrhea and Colitis in Sheats—W. W. Dimock 413

Field Observations in the Control of Infectious Swine Diseases—M. Jacob 427

Discussion of Papers on Swine Diseases 433

Reclassification Report Unjust to Veterinarians—J. A. Kiernan 442

Pioneer Work in Tuberculosis Control—Louis A. Klein 455

How the Cooperative Tuberculosis Eradication Campaign Affects and Appears to the Practitioner—J. F. DeVine 458

Clinical and Case Reports:

Gastro-Hysterotomy in a Heifer—Louis Levinson 461

Two Dog Cases—Arthur New 463

To Anesthetize Birds—N. S. Mayo 464

Abstracts 465

Army Veterinary Service 467

Association News:

Proceedings of the Fifty-seventh Annual Meeting of the American Veterinary Medical Association 472

A. V. M. A. Executive Board Meetings 480

Other Meetings 484

Necrology 500

Miscellaneous 503

The Journal of the American Veterinary Medical Association is issued the first of each month. *Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue.* Volumes begin in April and October.

Communications relating to publication, subscription, advertisements and remittances should be addressed to Journal of the American Veterinary Medical Association, 1620 Hobart St., Washington, D. C. Matters pertaining to the American Veterinary Medical Association and membership should be sent to Dr. N. S. Mayo, Secretary, 4753 Ravenswood Avenue, Chicago, Illinois.

$4.00 per annum Foreign, $5.00; Canada, $4.25 Single Copies 40 cts. in U. S.

Entered as Second Class Matter, February 4, 1920, at the Post Office at Washington, D. C., under Act of March 3, 1879. Acceptance for mailing at special rate provided for in Section 1103, Act of October 3, 1917; authorized February 4, 1920.

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Reprints should be ordered in advance. A circular of prices will be sent upon application.

VOL. LVIII, N. S. VOL. 11 JANUARY, 1921 No. 4

ANOTHER YEAR

NINETEEN hundred and twenty has been a year of transition from the flood tide of artificial war prosperity to the ebb of inevitable readjustment. As one writer has put it, the country has passed through a prolonged spree of reckless extravagance and is now at the castor-oil stage. The dose is unpleasant, but it will do the patient good.

Agriculture, with which veterinary science is economically in close relation, is suffering from large production at high cost and low selling value. It is unfortunate that the change from scarcity to plenty of food and clothing, bringing relief to the consumer, has been accompanied with loss to the producer. Economic law, however, may be expected to restore a proper balance during the coming year.

For the New Year the JOURNAL extends to its readers its best wishes for a generous measure of prosperity and professional success, with the happiness and satisfaction that come from useful service properly rewarded. It wishes also that they may have a part in forming and in attaining the higher aims and ideals of the profession.

BALANCE

SANITY, it seems, is a relative term, for none of us are perfectly sane—no, not one. When we speak of a person as having "good common sense" we inadvertently refer to his state of balance, but this quality may pertain to only one thing while he is manifestly "clear off his balance" on other things.

We must admit that all-around well-balanced persons are few and far between. Courage, zeal and balance, but the greatest of these is balance. The order of the eternal universe is founded on balance. Up and down, out and in, sunshine and shadow, centripetal and centrifugal forces, the ebb and flow of the tides, yea, the very planets in their courses are hung on the balanced wheel of gravitation. The mighty men of history whose lives have "lived after them" have been conspicuous for the quality of balance. The world takes a passing interest in brilliance, but it pays a lasting tribute to poise. Think of many people you know, and is your estimate of them in close harmony with your intuitive sense of balance? The man with the "level head" is sure to enjoy our confidence and command our respect. Not too much reserve, nor too much verbosity; not too much love of self, nor too much love of others; not too much materialism, nor too much spiritualism; not too much individualism, nor too much socialism; not too serious, nor too much given to levity; not wedded to established precedent, rule or regulation, nor too much of an iconoclast. The truth is most liable to be found in close juxtaposition to a point midway between the extremes. Balance is synonymous with equipoise; an even adjustment of forces, perfect sanity. May we keep our balance.

G. E. G.

WHAT ARE VITAMINES?

IN recent years it has become known that certain compounds, to which the name "vitamines" has been given, which are found in minute quantities in some foods, are necessary to the health and growth of man and animals. Scientific research has revealed much regarding the function of these substances in body maintenance and building and as to the parts of the foods in which they occur, but much yet remains in obscurity. It has been definitely proved that vitamines are absolutely essential in the food in order to maintain the weight of the body and produce growth, that lack of them in the diet causes the so-called deficiency diseases, and that exceed-

ingly small quantities suffice to meet the needs of the body. They are present in such minute proportions in the food, however, that chemists have not yet been able to isolate them from the many other compounds found in foods, hence we know very little of their actual character. In other words, they are much better known for what they do than for what they are.

These vital compounds have been classified into three different types, depending upon their functions in promoting well-being and growth.

The first type is known as water-soluble vitamines, and these are necessary in order to obtain growth from food. Lack of these causes beri-beri, which manifests itself by disease of the nervous system and by other symptoms. These vitamines are found in seeds, in green plants, in certain bulbs and fleshy roots and fruits, and in milk and eggs, as well as in certain organs in the animal body. The seeds referred to include beans, nuts and the various cereal grains. When cereals are very highly milled in order to obtain a very fine white flour, a large part of the vitamines may be removed. Vitamines are also lost when rice is polished in order to remove the outer layers, which contain most of the vitamines. It is for this reason that a diet consisting mainly of polished rice may cause beri-beri, while unpolished rice does not cause this disease.

The second type is known as fat-soluble vitamines, and these are found in butter, eggs, milk, and in certain animal organs such as the heart, kidneys and liver, and to some extent in other fats as well as in green vegetables. They also exist in smaller quantities in certain seeds. When fat-soluble vitamines are absent from the diet, animals and man are subject to a disease of the eyes which appears to be related to xerophthalmia and which, if prolonged, may produce blindness.

The third type is known as antiscorbutic vitamines; that is, those which prevent scurvy, which manifests itself by disease of the bones as well as in other ways. These vitamines are found in oranges, grapefruit, lemons and other citrus fruits, and in green vegetables, such as tomatoes, spinach and lettuce, and in eggs and raw milk. The drying of vegetables frequently destroys the activity of the antiscorbutic vitamines.

The best source of vitamines is in the leafy parts of vegetables, and this is one of the reasons why spinach, lettuce, and cabbage are valuable foods.

VETERINARY DRUG CONTROL IN FRANCE

A DECREE of the Ministry of Agriculture of France regulates the dispensing of certain classes of drugs for veterinary use, with a view to placing the treatment of animals in the hands of skilled and scientific men and preventing quackery and indiscriminate dosing with powerful and dangerous drugs. By this decree the right to keep, prescribe and deliver toxic substances is limited, and it is forbidden for a druggist to sell, for the treatment of animals, certain poisonous substances (preparations of arsenic, aconite, atropin, cantharides, chloroform, cocain, digitalis, ergot, morphin, opium, nicotin, savin, strychnin, etc.) without a prescription from an authorized veterinarian. Where a druggist and a veterinarian both reside in a town or village, only the druggist may keep and dispense the drugs, which the veterinarian must order. It is only in well-indicated cases that the veterinarian is permitted to keep such drugs on hand to be administered by himself. When certain of these poisonous substances are sold they must bear a firmly adherent label with the name and address of the authorized veterinarian, the name of the substance as given in the official list, the prescription number, a plain indication that it is a veterinary preparation, and the word "poison."

IMPROVEMENT IN STOCK BREEDING

THE "Better Sires—Better Stock" movement, carried on by the Government in coöperation with other agencies with the object of improving the average quality and general usefulness of livestock in the United States, has completed its first year of activity. During the year 2,756 persons enrolled, with a total of 131,482 animals and in addition 170,030 head of poultry.

According to a summary of results, there is a very small proportion of inferior female stock in herds and flocks headed by purebred sires. Only 2.7 per cent of the females are scrubs, and with poultry the figures are still lower, 2.2 per cent. Taken as a whole, the majority of female animals bred to purebred sires are grades. But approximately two-thirds of the sows are purebred, and two-thirds of all the poultry listed is of standard breeding.

Prominent among the persons enrolled are President Wilson with his flock of sheep and Secretary of Agriculture Meredith with his herd of dairy cattle. Forty-six States are coöperating with the Department of Agriculture in the campaign.

ON TO DENVER

AT the recent convention in Columbus, the question of naming the next place of meeting was carried to the floor of the convention, Colorado Springs, Colo., being selected. However, before adjournment on the last day, a motion was carried authorizing the Executive Board to change the place of the next meeting to some other city in Colorado if it were considered advisable, provided it was recommended and approved by the veterinarians of that State. Dr. Charles G. Lamb, acting as spokesman for the Colorado veterinarians, appeared before the Chicago meeting of the Executive Board and suggested that the 1921 convention be held in Denver on September 5-9, inclusive. This recommendation, after careful consideration, was finally adopted by the Executive Board, and it is now none too early to start your plans to take your vacation next September among the beautiful Rockies. You should also interest your fellow practitioners to assist in making a large attendance at Denver assured.

CODE FOR INTRADERMIC TUBERCULIN TESTS

THE following code for reporting cattle tested by the intradermic tuberculin test was unanimously adopted by the United States Live Stock Sanitary Association:

I. If one observation only is made, it shall be at the seventy-second hour after injection. If two observations are made, they shall be at the forty-eighth and ninety-sixth hours, respectively, after the injection. Under special conditions, more frequent observations over a more extended period of time are advisable.

II. An intradermic test shall be reported in accordance with the following code:

A. Animals showing no reaction shall be recorded at each observation as N—(Negative).

B. Reactors shall be recorded as follows:

a. For circumscribed swellings, pea size (diameter 3/16 inch) shall be used as a basic standard. Larger swellings shall be recorded as P-2, P-3, P-4, P-5, etc., in accordance with the findings, being two, three, four or five times the size of a pea.

b. For diffused swellings, "Thick 2-X" shall be used as the basic standard and signifies a diffuse swelling in which the injected caudal fold is twice as thick as the normal fold. Larger swellings shall be recorded as Thick 3-X, Thick 4-X, etc., in accordance with the findings.

VETERINARY EDUCATION AND ITS READJUSTMENT[1]

By C. D. McGILVRAY

Principal, Ontario Veterinary College, Toronto, Canada

IN attempting to deal with a topic such as veterinary education and its readjustment one is confronted with the handicap of touching a seemingly fully elaborated academic subject. Aside, however, from the purely academic phases which it presents, there are other aspects that require to be anticipated, if not immediately faced. Personally, I should prefer to come to you with a cheery message that all is well. But, after all, it is only the false prophet, and those of visionary faith, who proclaim "Peace, peace, when there is no peace." Without the guidance of the broad vision which sees the finished whole the skill of the individual is oft in vain.

In looking over the reports of attendance at the different veterinary colleges one is forcibly struck by the paucity of students, and more especially when compared with the enrolment in other sciences. From nearly all other branches of science the reports indicate a greatly increased attendance. From the faculties of medicine, dentistry, pharmacy, law, applied science and agriculture similar reports are in evidence that the student enrolment is satisfactory and in many cases double that of any previous year. The only apparent counterpart to veterinary science in declining attendance is found in faculties of divinity. Seemingly the attractions of the ministry and the veterinary profession are somewhat similar in the esteem of the young man charting his future career. For the time being we are at least in honorable company.

Be that as it may, the problem confronts us of how to attract sufficient recruits to maintain our numerical strength. Let it be clearly understood that, rightly or wrongly, the future success and prestige of veterinary science may be largely influenced by the desire of qualified pupils to attend accredited colleges, and, ultimately, the welfare of the profession, by the numerical strength of its membership being maintained. Let us assume that we are approaching the parting of the ways. A little frank retrospect may assist us in charting our future course.

During the past year the total enrolment at accredited veterinary colleges was less than one-half that of one of the so-called veterinary correspondence schools and veterinary correspondence dentist

[1] Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

diploma mills. This concern claims to have a yearly enrolment of over 2,300 pupils outside of Canada, and a gross revenue of $40,000 from this source. Unless such concerns are prevented from further creating and exporting their illegitimate products for veterinary practice the profession will continue to be wrongly estimated. The personnel of the profession must be maintained by graduates from accredited colleges.

Heretofore the prevailing plea has been that spacious and well-appointed colleges with close university affiliations and full matriculation were required to exemplify the dignity and status of the medical profession, and there seemed no good reason for not expecting the same for the veterinary profession; likewise, that veterinary science and medical science should be more closely interlocked with each other and thus be made equally attractive. The teaching staffs of veterinary colleges should be strengthened by an infusion of medical men. We have progressed in these directions without having attained the desired preëminence or any noticeable attention of a munificent nature through such channels. In fact we have reason to feel at times discouraged at the approachment made between medical and veterinary science being so unfruitful in many respects. Personally I am inclined to think that a readjustment toward agriculture will be more hopeful of results. The transition which is taking place in our professional activities throws us more closely to rural problems.

The insistent demand for practitioners from agricultural communities must be heeded and provided for. The shortage of graduate veterinarians for Federal and State or Provincial appointments will become more embarrassing. A careful census of the probable complement of graduates required to meet present and future needs should be undertaken and strenuous efforts made to induce a sufficient number of suitable candidates to attend veterinary colleges. The reason or reasons for the reduction of candidates for the profession should be carefully reviewed.

Apparently the increased length of the course from three to four years, together with the advanced entrance requirements, has had some effect. Personally I am an advocate in favor of both, but consider that some adjustments may be advisable for a time without impairing the principles involved. Selective candidacy for the veterinary profession was probably too long delayed for the good of all concerned, and more especially for those now entrusted with the responsibility of obtaining sufficient recruits of the desired type

to study for the profession. The standard of qualification and type of candidate which predominated so largely for the profession during the past has prevailed as a barrier to some extent, preventing the desired matriculants from now entering in reasonable proportion to the other sciences. The baneful effects of low standards may not be immediately dispelled or easily overcome. If good standards are maintained the better elements are attracted, as every young man entering a profession acts as a force to attract or repel others.

Generally speaking, the only visible source of supply for candidates able unconditionally to meet university entrance requirements is from the annual matriculation classes of high schools and collegiate institutes. Those comprising the matriculation classes have, as a rule, been matriculating for the express purpose of enabling them to qualify for admission to university classes. Many of these matriculants are not over 18 years of age, and have originated from urban centers without any opportunity of acquiring a knowledge of agriculture or livestock experience. As a result their inclinations may tend to divert the majority of them to other faculties than veterinary science. Efforts must be made to attract a larger proportion of matriculants to veterinary science as a suitable profession offering equal opportunities to the other learned professions.

In order to tap the direct source of supply in Canada a suitable poster and bulletin describing the opportunities and advantages of the profession was sent to all of the high schools and collegiate institutes in the Dominion, extending from the Atlantic to the Pacific. A total of 950 schools were thus canvassed. In addition a vigorous advertising campaign was conducted from January to August in 19 high-class papers and agricultural journals. The sum of $900 was expended for advertisements, and suitable articles furnished to the press were published gratis by them. Many inquiries were received, and to meet them 2,500 copies of the College Calendar and Bulletin were printed for distribution.

The type of applicant is unquestionably superior to previous years, as indicated by penmanship and composition of their letters. As yet it is difficult to determine definitely the number able to furnish university matriculation certificates or likely to pass unconditionally the equivalent qualifying examination. A considerable number possess two or more years' high-school or collegiate education and show evidence of having received a sound education in essential subjects as a basis for pursuing further academic studies. Candidates of this class are generally over 21 years of age and have

commercial and agricultural experience, and many have been on military service overseas. They have reached the age at which they are unlikely to return to a high school or collegiate institute to complete their matriculation. Unless the colleges can so adjust the entrance requirements to permit a reasonable allowance of conditional candidacy to applicants over 21 years of age possessing two or more years' high-school education the number of new matriculants for the incoming session may be extremely limited.

It is worthy of notice that one of the leading State colleges has provided for the acceptance of candidates over 21 years of age as special students on the presentation of satisfactory reasons and provided that if any such student afterwards becomes a candidate for a degree he shall take the omitted entrance examination one year before the degree is conferred, or undertake excess work in other approved subjects. If my interpretation of this provision is correct, it means that candidates over 21 years of age possessing less than a complete high-school or collegiate education will be accepted and given the opportunity of improving their education and matriculating during the first three years of their course. This adjustment may be equitable and wise and should be carefully considered as to its adoption tentatively to augment the attendance through conditional candidacy. At the same time the number so admitted should be limited only to insure a sufficient complement in the entering class as may be justified by necessity.

After all, the possession of a certificate of four years' high-school attendance may not always abstractly afford a safe criterion as to one's capabilities or preparation for veterinary science studies and professional adaptability. The candidate who has received his preliminary education in Great Britain by completing the prescribed public-school standards and passing the required examinations, and then acquires two to three years' additional education in a high school, grammar school or an academy in Great Britain, is usually as well prepared academically as the candidate with four years' high-school education acquired in many parts of the United States and Canada. Likewise, many candidates between the ages of 18 and 25 years, possessing at least two years' high-school education, supplemented by commercial training and livestock experience, often prove to be satisfactory material for veterinary science studies and professional usefulness. The enabling of such candidates to obtain matriculation should be carefully approached. In this connection

a pre-veterinary year might furnish a satisfactory means for such a purpose and to maintain a good standard of qualification and type of candidate.

By arranging a suitable course of studies some good candidates with partial matriculation might be prepared and accepted through a selective and properly safeguarded draft at the completion of the year's course. Any readjustment of veterinary education must anticipate either an expansion or contraction of the profession. If a satisfactory complement of acceptable candidates are not attracted to veterinary science studies at accredited colleges, and a sufficient number of accredited graduates regularly provided to meet the needs, we may be confronted with professional decline through reduced personnel and numerical insignificance.

ONTARIO VETERINARY COLLEGE—SESSION 1919-1920

Standard of Qualification of the First-Year Class

A total of 98 applications were received for admission to the first-year class. Of this number 33 were accepted.

Twenty-three entered by furnishing a high-school certificate. Seven of these had full university matriculation certificates; 5 had certificates of partial matriculation, having successfully completed three years in a high school or collegiate institute; 11 presented certificates for at least two years' high-school education. Ten were accepted by successfully passing the qualifying entrance examination based on the equivalent of two years' high-school education. The remaining 65 applicants were refused admission either as a result of failing to pass the entrance examination or their inability to take the examination.

ONTARIO VETERINARY COLLEGE—SESSION 1919-1920

Attendance from the Different Provinces and States

	1st Year Class	*2d Year Class*	*3d Year Class*	*Graduating Class*	*Total*
Ontario	10	7	4	11	32
Manitoba	7	3	None	None	10
Saskatchewan	4	None	4	1	9
Alberta	1	1	None	1	3
British Columbia	1	1	None	None	2
Quebec	2	None	None	None	2
Nova Scotia	2	None	None	1	3
New Brunswick	None	None	None	None	None
Prince Edward Island	None	None	None	None	None
Newfoundland	1	None	None	None	1
Bermuda	1	None	None	None	1
British West Indies	None	3	1	None	4

Pennsylvania	1	None	1	None	2
New York	None	1	None	None	1
North Dakota	None	2	None	None	2
Ohio	None	1	None	None	1
Wisconsin	None	1	None	None	1
Illinois	1	None	None	None	1
Vermont	1	None	None	None	1
Maine	1	None	None	None	1
Michigan	None	None	None	1	1
Totals.....	33	20	10	15	78

NATIONAL RESEARCH COUNCIL

A SITE for the new building in Washington which is to serve as a home for the National Academy of Sciences and the National Research Council has recently been obtained. It comprises the entire block bounded by B and C Streets and Twenty-first and Twenty-second Streets, Northwest, and faces the Lincoln Memorial in Potomac Park. The Academy and Council have been enabled to secure this admirable site, costing about $200,000 through the generosity of their friends and supporters. Funds for the erection of the building have been provided by the Carnegie Corporation of New York.

Dr. Gregorio San Agustin, instructor in Animal Husbandry in the University of the Philippines, after spending several years in the United States as a University Fellow, has sailed for Manila, in order to take up his work once more with the University. Dr. San Agustin is a member of the A. V. M. A.

Professor H. Vallée, an honorary member of the A. V. M. A., has resigned as Director of the Alfort Veterinary School for reasons of indifferent health, and has been appointed Director of the Research Laboratory of the French Sanitary Service. Professor Cadiot has assumed the Directorship of the Alfort Veterinary School.

Professor Ch. Porcher, Professor of Chemistry at the Lyons Veterinary School, recently delivered a course of twelve lectures before the School of Infant Welfare of the Faculty of Medicine of Paris. It is, indeed, encouraging to learn that a veterinarian is considered a sufficient master of the intricate subject of chemistry to warrant being invited to deliver a series of lectures to medical men in a Medical Faculty.

THE PRESENCE OF MICRO-PARTICLES IN THE BLOOD AND OTHER BODY FLUIDS[1]

By S. H. Gage *and* P. A. Fish

New York State Veterinary College, Cornell University, Ithaca, N. Y.

ALL organic foodstuffs are broken down, in the process of digestion, into simpler constituents or construction units in order to be of service to the body tissues. Proteins are converted into amino-acids, carbohydrates into monosaccharids, and fats into fatty acids and glycerin. None of the foodstuffs can be utilized in their original form; all must be dissociated by the digestive processes, and such portions of them as may be required are reconstructed into new or replacement tissue of the host. The animal body is continuously rebuilt and kept in repair by substances which have originated outside of itself. Dissociation and reconstruction changes can be demonstrated more or less clearly by means of chemical tests, and these have furnished the data upon which our knowledge is principally based. The introduction of the dark-field microscope has, however, made it possible to furnish visible evidence which may supplement, confirm and perhaps enlarge our information concerning certain of the body fluids and the changes that occur in them.

The presence of the minute particles in the blood, usually referred to as molecular base, elementary granules, blood dust, etc., and supposed by many to represent the débris or broken-down portions of the blood elements, can now definitely be shown to be related to the fatty portion of the diet. A purely protein diet or a purely carbobydrate diet contributes nothing to their presence in man, but a purely fat diet, or a mixed diet containing fat, causes a very marked increase in these particles under normal conditions. This method has therefore a very distinct value in confirming or checking up other methods concerned with the study of fat in the blood and lymph of the body.

The protein and carbohydrate construction units are absorbed from the intestine into the blood of the portal system and must pass through the liver before they can reach the tissues. Fat, or at least a large portion of it, holds the unique distinction of passing first to the general circulation and later in part to the liver. It has the further distinction of appearing in the blood, not in the form of its

[1] Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

constituents as is the case with protein and carbohydrates, but as reconverted fat which has been rebuilt from its constituents before it has had opportunity to enter the blood. The liver thus acts as a censor to protein and carbohydrate material, while some of the fat apparently escapes this censorship.

It is quite generally accepted that the fat of the food gets into the blood after it has undergone saponification in the intestine and is absorbed by the epithelium in water-soluble form as soaps and glycerin. These constituents are at once resynthesized into fat again

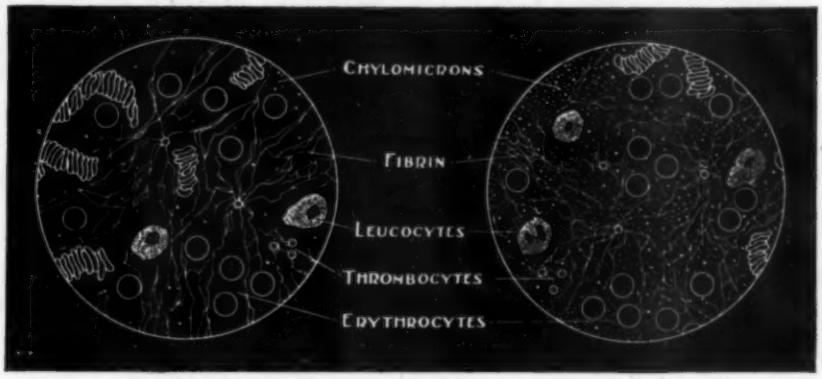


Fig. 1.—The diagram at the left shows the scarcity of the particles in the blood after a period of fasting. The diagram at the right shows the blood loaded with particles after the ingestion of fat

by the intestinal cells and passed into the lymph vessels of the intestine as the "molecular base of chyle," and thence through the thoracic duct to the general blood circulation. About 60 per cent of the food fat has been determined in the chyle in this way. The remaining smaller quantity is assumed to be absorbed directly into the blood of the intestinal capillaries. This assumption has received support from the work of Munk and Friedenthal (Zentr. Physiol., 1901, Vol. 15, p. 297), who found that the fat in the blood increased after the thoracic duct had been ligated; also by the observation of d'Errico (Arch. Fisiol., 1907, Vol. 4, p. 513) that the fat content of the portal vein was higher than that of the jugular vein during fat absorption, and by the work of Hamburger (Arch. Anat. u. Physiol., Physiol. Abt., 1900, 554), who found that the absorption of soaps from an isolated loop of intestine took place after all visible lymph vessels had been ligated. R. Ehrström (Finska Läk Handlingar,

1917, Vol. 59, pp. 1259-1273, ref. Physiol. Abstr., 1917-18, Vol. 2, p. 675), states that fat transport in the body is carried out partly by the plasma, partly by the corpuscles of the blood. In the plasma the greater part is in solution, and only a small amount is undissolved as the so-called hemokonia. The blood fat is a fairly constant figure.

Since all of the fat ingested with the food has not been accounted for in the thoracic duct route to the blood, the inference, with the supporting evidence previously mentioned, is that the remainder of the food fat enters the portal blood and submits to the censorship of the liver. Ligation of the thoracic duct or of the intestinal lymph vessels is an abnormal condition and would indicate that under compulsion there is a forced absorption of the fat into the portal system which under normal conditions would directly enter the general circulation. D'Errico's observation that, during fat absorption, the fat content of the portal vein was higher than that of the jugular vein would indicate that the greater percentage of fat was absorbed through the portal route, unless it can be demonstrated that some of the fat, turned into the general circulation by the thoracic duct, is lost in the circuit of the body before the jugular vein is reached, or that all of the fat does not appear in the blood in a fine state of division as the "molecular base of chyle," or that it is absorbed in different forms.

Mansfeld from his investigations (Magyar Orvosi Arch. 9; cited in Jahresber. Tierchem., 1908, p. 84; Pflüger's Arch., 1909, 129, 46, 63) concludes that some of the absorbed fat enters into some sort of combination with the protein in the blood and consequently is insoluble in ether. On this account, also, it may escape osmic acid staining. If this view is correct it necessitates the acceptance of the idea that fat exists in the blood in two forms: as free fat and combined fat, the free fat we assume being represented by the minute particles.

Our experiments with the dark-field microscope show results which do not accord with the observations of d'Errico so far as the *free* fat of the blood in the portal system is concerned. Observations were made upon five cats of various ages during different stages of fat absorption. A careful count was made of the free particles in the blood of the portal vein and that in the aorta representing the general circulation. In two of the cats counts were also made of the particles in the jugular vein. In all cases there were markedly fewer particles in the portal vein than in the other vessels. It was also found that the number of particles in the blood of the jugular vein was but

slightly less than in the blood of the aorta. If the view of free and combined fat is accepted, the obvious explanation for a greater amount of total fat in the portal blood is that a larger proportion of combined fat is present than in the general circulation and the combined fat is not visible in the dark field of the microscope.

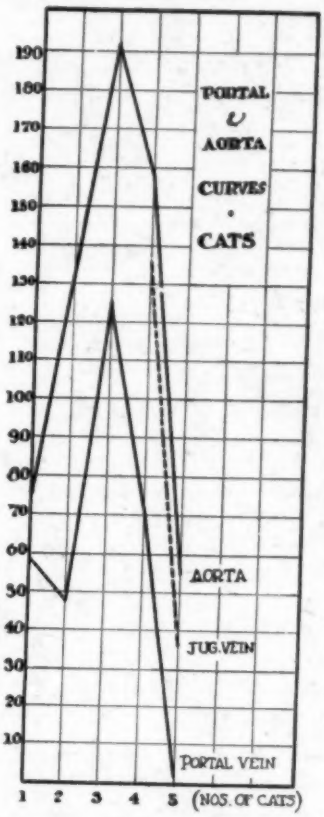


Fig. 2.—Curves from cats. This figure shows the number of particles in the blood vessels indicated during fat absorption.

The difference in the form, size, arrangement and development of the alimentary tract in the domesticated animals present an interesting and important field for investigation with the dark-field microscope in relation to the presence of these particles in the blood and their connection with fat absorption. Thus far only preliminary observations have been made upon the horse, cow, dog and man. In the case of the herbivorous animals a relatively small amount of fat is present in their ordinary diet, and a study of the blood curve in connection with digestion shows no unusually great augmentation of the particles.

Differences in the form of the curve may be expected in the different species, also in the same individual at different times, this difference probably being due to nutritional conditions.

EXPERIMENTS ON HORSES

Two observations were made upon the same horse upon an ordinary diet at different times. The animal was not at work and the morning meal received 4 quarts of oats with hay and in the afternoon 4 quarts of bran with hay. The experiment in one instance was begun at 9 o'clock in the morning and the other at about 8 a. m. In both cases the observations covered a period of 24 hours and the first observation was taken before the morning meal was given. Examination of the curves shows the number of particles in the blood fluctuated during the day and evening until midnight. After midnight the number

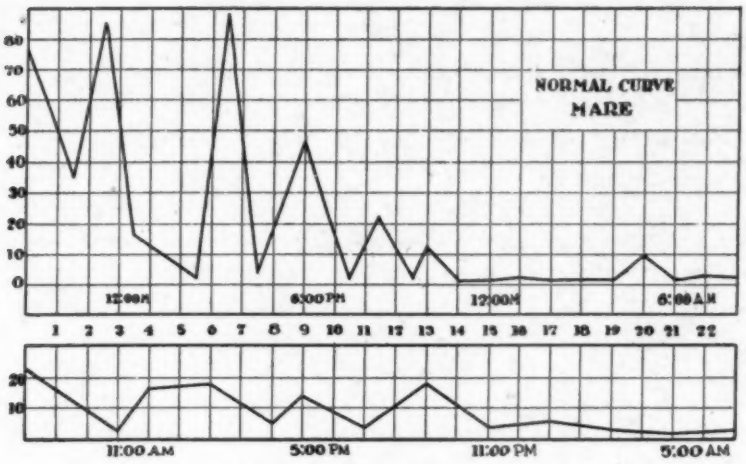


Fig. 3.—Curves from mare on normal diet

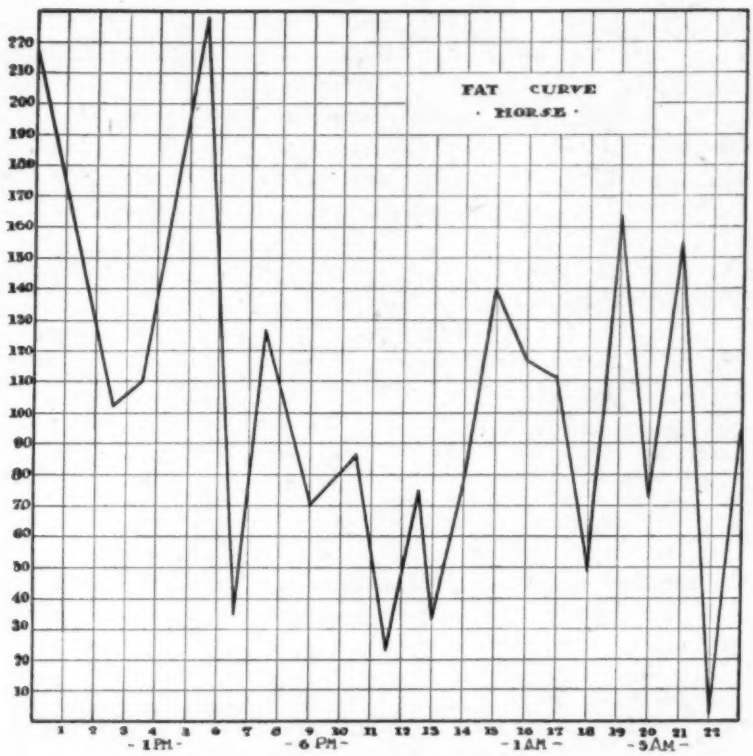


Fig. 4.—Fat curve from horse No. 1

of particles was small and there were no very marked changes. After the first meal the number of particles in the blood rose and fell until the second meal, after which there was a continuation of the rise and fall of the number of the particles until midnight.

Another experiment was carried out upon two other horses in relation to the absorption of fat. The horses had had nothing to eat since the afternoon of the previous day. At 9 o'clock in the morning a half pound of butter was given to each horse and the animals were fasted during the following 24 hours. The curves of the two horses were markedly different. In horse No. 1, the first observation, before the administration of the butter, showed an unexpectedly high number of particles in the blood. The number decreased during the next three hours and then rose to the maximum, as the butter was absorbed, between the fifth and sixth hours. Thereafter the number fell, showing some fluctuations with some rise again at the eighth, fifteenth, nineteenth and twenty-first hours.

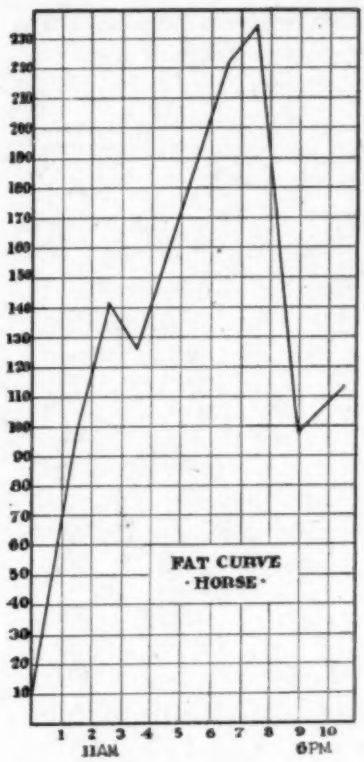


Fig. 5.—Fat curve from horse No. 2

Horse No. 2 showed but few particles in the blood before the butter was administered. The curve showed a rapid increase in the number of particles in the blood between the first and second hours, and this continued until the maximum was reached between the seventh and eighth hours. Thereafter the number of particles decreased rapidly. No observations were taken after the tenth hour because of the opposition of the horse.

The butter curve of horse No. 2 is similar to the butter curve obtained from man. In two human subjects it was found that fat absorption, as shown by the dark-field microscope, began in an hour or two, reached its maximum in from three to five hours, and then declined rather rapidly. The butter curve of horse No.

1 seems to present unusual features and emphasizes the differences that may be found in different individuals of the same species. Both animals worked during the week, except Sunday when the observations were taken, and both appeared to be in excellent physical condition. In horse No. 1 the great number of particles in the blood before the butter was administered is difficult to explain under normal conditions. The variations in numbers that followed would indicate that the butter was absorbed at various intervals during the 24-hour period.

The method of digestion is a factor which must be considered. It has been taught that the stomach of the horse has very little peristaltic action and that some food may remain in it for a number of hours (18 to 36) before the stomach is completely emptied. When a meal is eaten the food does not pass out until the stomach becomes two-thirds full, and then the food passes through the stomach into the intestine as rapidly as it enters. After the meal has been finished the passage of the food from the stomach is greatly retarded and from 18 to 36 hours are required to remove the food completely, which represents the two-thirds capacity of the stomach. Accepting this view, it is possible to consider that in the case of horse No. 1 the contents of the stomach had been largely removed before the butter was administered and it was retained until the stomach was able to remove small portions of it at intervals during the following 24-hour period. In the case of horse No. 2 it may be considered that the stomach was filled more closely to the two-thirds limit and when the butter was administered it passed over into the intestine in a comparatively short time.

EXPERIMENTS ON COWS

Cow No. 1 had been fasted since the morning of the previous day except for a small amount of hay which remained in the stall from the previous feeding. She was milked twice a day but gave only about 3 pints at each milking. She had been fed upon bran, cut beets and hay. At 9 o'clock in the morning she was given one-half pound of butter. Her blood showed the presence of few particles until the sixth hour, when there was a considerable increase in the number, indicating some fat absorption. The decline in number was rapid within the next hour, and the number remained low until the twelfth hour, when there was some increase, with a fall, followed by the maximum increase at the fourteenth hour, with the number

remaining comparatively high until the sixteenth hour, when there was a fall, followed by another increase at the eighteenth hour, with a fall at the twentieth hour and the particles remaining few in number until the end of the experiment.

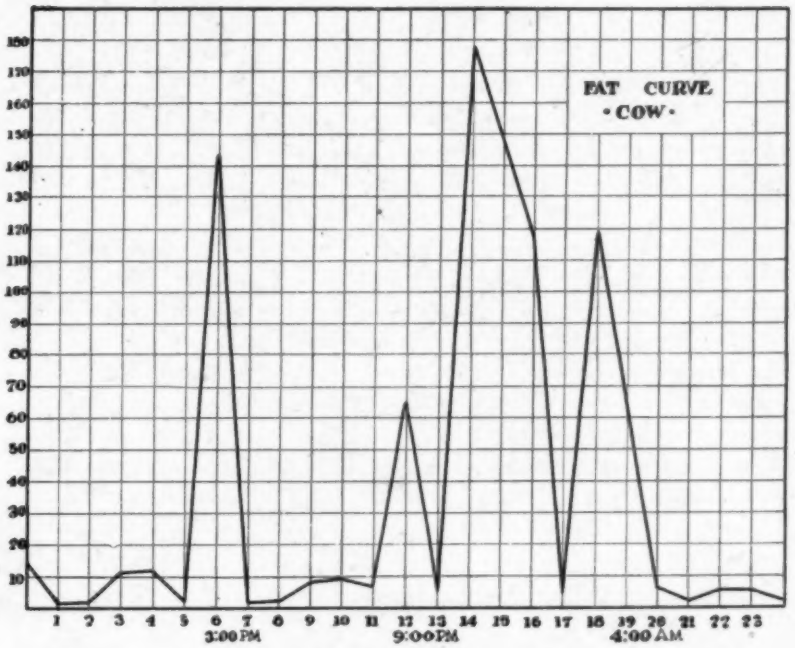


Fig. 6.—Fat curve from cow No. 1

Cow No. 2 was also giving only a small amount of milk. She was fed 8 quarts of bran and hay morning and night. She was fed as usual during the experiment, as the object of the experiment was to determine the changes in the number of particles in connection with her usual ration. The first observation showed but few particles present in the blood. There was some increase at the second hour,

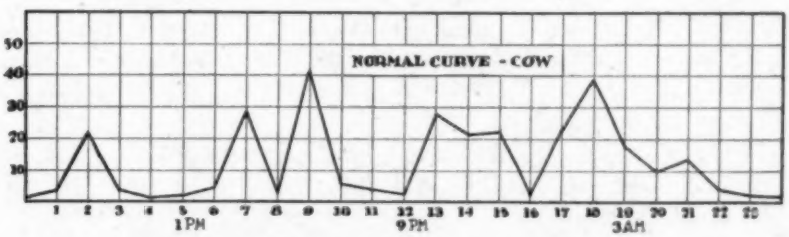


Fig. 7.—Normal curve from cow No. 2

followed by a decline, with a greater increase at the seventh and ninth hours. She was fed just after the ninth hour, and the particles remained few in number until the thirteenth hour; they continued fairly numerous until the fifteenth hour, when they decreased, to rise again at the seventeenth hour, to fall again at the nineteenth hour and remain at a low level for the remaining 5 hours.

In both cows the data indicate that fat absorption may occur at intervals during the greater portion of the 24 hours, and that only

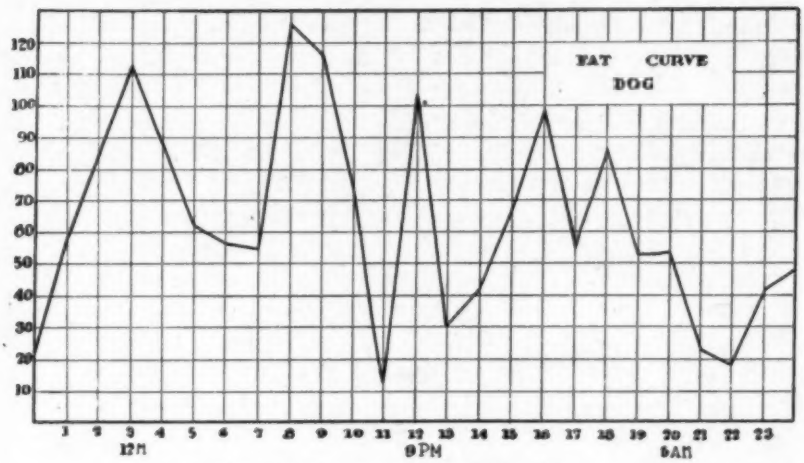


Fig. 8.—Fat curve from dog No. 1

during the last 4 or 5 hours there is no indication of it. To account for the results it is again necessary to consider the method of digestion, which, in the cow, is complicated with the process of rumination. If it is accepted that all, or the greater portion, of the food must pass to the rumen—the first compartment of the stomach—and remain there until the process of rumination brings it back to the mouth for remastication and passage to the fourth or true stomach, it may readily be understood why the absorption of fat may be delayed and occur at intermittent intervals.

EXPERIMENTS ON DOGS

Dog No. 1 was a young Boston bull dog and after the breakfast of the previous day had been fasting up to the time of the experiment (23 hours). At 9 o'clock in the morning there were given 30 grams of butter mixed with some rice flavored with meat extract, which was eaten readily. The rice served as a vehicle of administration, and being practically a pure carbohydrate, had no influence on

fat absorption. The curve obtained for the 24-hour period indicated waves of fat absorption occurring at the second, seventh, eleventh, fifteenth and seventeenth hours.

Dog No. 2, an Irish hound pup, was suffering from rickets and was unable to walk. A tablespoonful of cod-liver oil emulsion with hypophosphites was given at 9 o'clock after the animal had fasted 17 hours since the afternoon meal of the previous day. The observations were continued for 8 hours. The curve shows a rapid rise during the first 2 hours, then quite a marked fall the third hour, a rise to the maximum at the fourth hour and a decline to the starting point at the end of the eighth hour. Under the cod-liver oil treatment twice daily the dog subsequently made a good recovery.

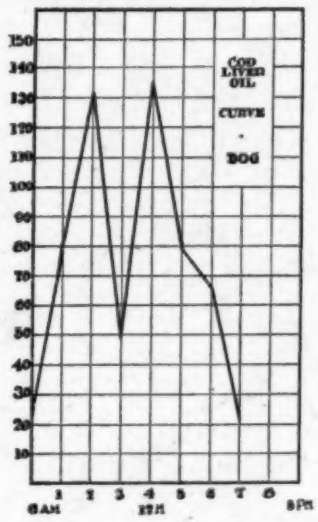


Fig. 9.—Fat curve from dog No. 2

GLYCERIN EXPERIMENTS

An interesting question with regard to fat production is: If certain of the constituents are supplied can the necessary other constituents to build up fat be furnished by the tissues? The following experiments upon two dogs, while showing remarkable individual differences, seemingly indicate that sufficient fatty acids can be furnished by the tissues to cause a marked increase in the number of particles in the blood.

Dog. No. 1, a young bull terrier 6 or 7 months old, had fasted 17 hours since his afternoon meal of the previous day. At 9 o'clock in the morning 4 mils, or cubic centimeters, of glycerin diluted to 20 mils with water were administered. Observations were made over a nine-hour period. The curve showed an increased number of particles during the first hour, followed by a decrease, and then an increase which reached its maximum at the sixth hour.

Dog No. 2, a mature Airedale terrier, was fasted for 23 hours before the experiment. At 9 o'clock in the morning 16 mils of glycerin, diluted to 30 mils with water, were administered. The curve showed a slight increase in the number of particles at the fifth hour, after which there was a fluctuating decrease until the

twelfth hour, when there was another increase reaching its maximum at the fourteenth hour, with a somewhat gradual decrease until the nineteenth hour, after which the number of particles remained at a low level until the end of the 24-hour period.

A comparison of the two experiments shows that in one case fat production was accomplished early while in the other case it was long delayed. Other investigators have shown that if fatty acids alone be administered the tissues are able to furnish sufficient glycerin to form fat. The foregoing experiments would indicate that the rule may work also in the reverse direction and that a

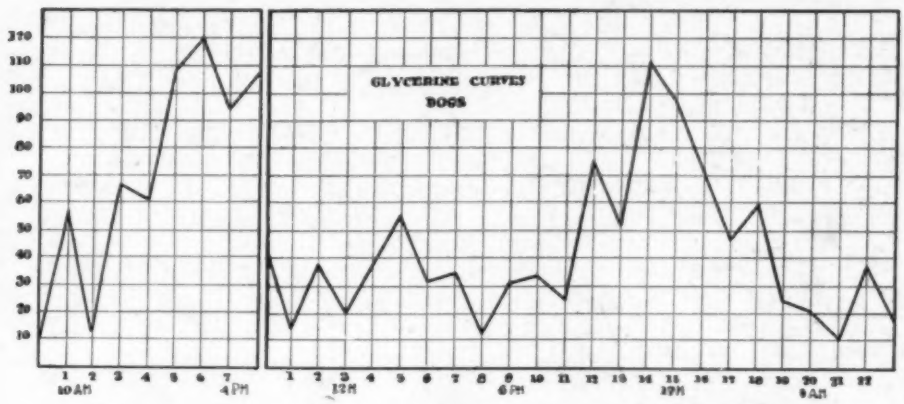


Fig. 10.—Glycerine Curves. The short curve at the left is from dog No. 1. The longer curve at the right is from dog No. 2

sufficient amount of fatty acids can be furnished by the tissues to build up fat from the glycerin that has been ingested. Further experiments are, however, necessary.

OLEIC ACID AND SUDAN III

An experiment was performed upon a male cat which had been castrated. After fasting for 24 hours he was fed some boiled rice with a little beef extract. A considerable portion was eaten at 10 a. m., and at 11 a. m. 5 mils of oleic acid with a knife point of Sudan III dissolved in it was poured into the cat's mouth. At 3 p. m. (4 hours later) the cat was killed and an examination made. The chyle in the truncus intestinalis was of a definitely pink color. The vessel was tied and opened at the peripheral end. Some of the chyle was taken up with a pipette and placed in a clean bottle. In mass it appeared decidedly pink. The thoracic duct appeared clear or only slightly cloudy. A count of the particles (five fields being

used as an average) showed in the thoracic duct an average of 115, in the aorta 13, in the jugular vein 15, in the portal vein 5.

There was much red material noticed in the stomach, and the small intestine contained pink substance nearly its whole length. Evidently fat absorption had not reached its maximum, and more striking results might have been expected if the process had been allowed to go on for one or two hours longer. The evidence also indicates that after the ingestion of one of the fatty acids the intestinal tissue was able to furnish a sufficient supply of the other constituents (i. e., other fatty acids and glycerin) to construct neutral fat.

BUTTER AND SUDAN III

A well-nourished dog was fasted for 24 hours,, and then fed 160 grams of beef, 40 grams of butter and one egg. The butter was mixed with 0.55 gram of Sudan III. The animal was killed 6 hours after it was fed. The lacteals, truncus intestinalis and thoracic duct showed a markedly pink color; the pink color was also marked in the blood serum. The blood was full of particles, as shown by the following count (five fields being used as an average): Aorta, 241; jugular vein, 215; portal vein, 237.

SECRETIONS

The blood with its accessory, the lymph, may be regarded as the fundamental fluid of the body, and the various secretions may be considered as by-products which have undergone more or less modification and addition by the glands which elaborate them. Without blood, secretions could not exist. It is not intended to imply that because these minute or ultra-particles exist in the blood and chyle they may also exist in the various secretions, or that if present in certain of the secretions they are necessarily of the same nature as those in the blood. In an incomplete preliminary examination the particles have not as yet been found in the saliva, bile, or urine, although these fluids show more or less viscosity comparable with that of the blood. Their presence has been demonstrated in milk. Kreidl and Neumann (Arch. die Gesammte Physiologie, 1908, v. 123, pp. 523-539) have found particles present in the milk of the cow, dog, cat, rabbit, guinea pig, elephant, goat, horse and rat. To this list we can add the milk of the ewe.

We have been able to demonstrate the presence of particles in the semen of man and of the stallion and have not thus far been able to

find mention of this condition in the literature available to us. Aside from the blood and chyle, the possible limitation of particles to two secretions functioning with the sexual system may or may not have special significance.

In milk the fat globules have, with the dark-field microscope, a characteristic appearance; they vary greatly in size and in some instances are so small as to make it difficult to distinguish them from the particles. There is, however, a difference in the power of refracting the light. The opacity of milk is believed to be due not merely to the fat globules but to a certain amount of casein in combination with calcium, or calcium caseinate, in suspension. When a drop of whole milk is placed under the objective of a dark-field microscope, there is so much material reflecting the light that a bluish or slate-colored background is presented instead of a distinct dark field. This interferes more or less with the study of the particles, but the difficulty may be overcome by diluting the milk with water in the proportion of 1 to 100 with very satisfactory results as to the dark field. Kreidl and Neumann state that in woman's milk the particles are "completely absent or almost completely absent," but observe later that if woman's milk be shaken with ether "these structures are also shown, appearing finer and more delicate than in cow's milk, but quite clearly."

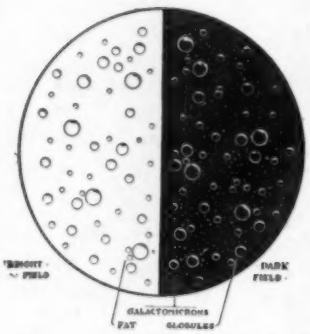


Fig. 11.—The left half shows milk as it appears with the ordinary microscope. The right half shows its appearance with the numerous particles under the dark-field microscope

THE COMPOSITION OF THE PARTICLES IN MILK

The fact that there is naturally an abundance of fat globules in milk might reasonably justify the view that the fat is taken care of in this way and that any fat in the form of particles would be superfluous. Furthermore, when milk is shaken with ether, there is no apparent disappearance of the particles. As a matter of fact the mere shaking of milk with ether does not cause the disappearance of the fat globules, although ordinarily fat is readily soluble in this agent. Because of their insolubility when shaken with ether, Kreidl and Neumann reject the idea of the fatty constitution of the milk particles. They believe them to be of a protein nature and to rep-

resent casein in suspension. This conclusion is reached as a result of digestion experiments. To some fresh cow milk was added a slight amount of pankreon and the test was carried on 6 hours in an incubator. At the conclusion of the test they found under the microscope a complete absence of the particles. A similar test with pepsin on milk rendered weakly acid gave similar results.

Digestion experiments were also carried out by us with the proteolytic enzyme trypsin, and papain, a vegetable enzyme acting upon protein. Separate samples of milk were used with each enzyme, besides the control. The tubes were placed in the incubator and digestion was allowed to proceed for 21 hours. At the end of that time there was gross evidence of digestion changes in the trypsin and papain tubes, but none in the control tube. Under the microscope there was no longer the bluish or slate background but a distinct dark field in which there were still present numerous particles but much fewer than in the control. It was estimated that about one-third of the particles still remained. There appeared to be very slight or no difference in the digestive action of the trypsin and papain so far as the number of particles was concerned. This result suggests the possibility of the presence of two kinds of particles in milk, one kind of a protein nature, digestible by the enzymes, and the other not protein.

The fat-splitting enzyme (lipase) of the pancreas is considered to be a very sensitive enzyme, so that extracts or preparations made from the pancreas are deficient in this action. Results of its action are claimed, however, if a portion of the fresh pancreas is placed with neutral fat at the proper temperature as evidenced by the appearance of fatty acids. Another experiment was carried out in which a portion of fresh pancreas from a cat was added to some milk and the mixture with a control was placed in the incubator and digestion allowed to proceed for 22 hours. At the end of that time the particles had nearly all disappeared in the tube containing the pancreas, but the fat globules were numerous. The question as to the presence of more than one kind of particle in the milk needs further investigation, and it is hoped that more definite information can be gained in the future.

Of great interest in this connection are the observations of Mendel and Daniels on "The Behavior of Fat-Soluble Dyes in the Animal Organism" (Jour. Biol. Chem., 1912-13, Vol. 13, pp. 71-95), in which they state: "The excretion of Sudan III and Biebrich Scarlet in milk, when they are given with the food fat, suggests that the latter

may pass directly into the mammary secretion. With cats and rats the results are striking, but the dye excretion in milk ceases when the stained fluid is no longer fed. In guinea-pigs and goats the secretion of the dye in the milk is positive; in the cow it has not yet been demonstrated (although large doses of Sudan III were administered). The variation in the outcome in the different species may be due to variations in the relative abundance in the dietaries of fat necessary for the absorption and transport of the dye. This explanation is emphasized by the observation that those animals (cats, rats, hens, pigeons) for which fat enters more largely into the diet, becomes stained more easily or speedily than animals which are accustomed to ingest relatively small amounts of fat."

ALIMENTARY LIPEMIA

Whenever fat has been ingested and a suitable time has been allowed for its absorption to take place, its path may easily be traced, by the milky appearance of the intestinal lymph vessels and thoracic duct, to the blood. The plasma or serum of the blood itself at this period has a distinctly milky appearance and if examined with the dark-field microscope will reveal a storm of fat particles in active Brownian movement. This means that the blood is receiving the particles more rapidly than it can dispose of them. In due time the storm subsides and the particles nearly all disappear. This excessive number of particles may be considered a temporary, normal, or alimentary lipemia. The disappearance of the particles may be due to the presence of a lipolytic enzyme which is believed to exist in the blood, or to their passage through the walls of the capillaries, or to a combination of these two factors. Ultimately the fat reaches the tissues and is demonstrable particularly in the liver, spleen, bone marrow and adipose tissue. The fat thus drafted from the food is mobilized in various depots as a reserve supply against the time of need. In starvation and under certain pathological conditions the reserves are called into action and fat again appears in the blood.

PATHOLOGICAL LIPEMIA

Diabetes was the first disease to attract attention in connection with the increased amount of fatty material in the blood. As far back as the days when blood-letting was common, a milky serum from the blood in many cases of diabetic coma was observed, from which it is said a "cream" arose on standing. Our earliest information relative to blood fat in disease dates from that time. Differences in results

have been observed in diabetic cases, and the reason for these differences is doubtless associated with the fat nutrition of the individual.

The "total fatty acids" of the blood have been found to be increased in nephritis, in pneumonia, in pregnancy, and in experimental anemia in animals (Bloor, W. R., Jour. Biol. Chem., 1916, Vol. 25, pp. 577-599). Lipemia has also been observed in cases of chronic alcoholism, long continued narcoses, phosphorus poisoning and a number of other toxic conditions.

In starvation lipemia, Bloor (loc. cit.) observed that in some dogs there was an increase in the blood fat during fasting up to about the fifth day and after that a decrease; in others there was no increase. He concludes that the results depend upon the nutritional condition of the animals at the beginning of the experiment, as it was only the well-nourished ones that showed starvation lipemia.

Narcosis Lipemia. Bloor found that in dogs ether produced a rise in the fat content of the blood during the narcosis. Chloroform did not increase the blood fat during the narcosis unless the animal had been fed considerable fat previously. He found, however, there was an "after rise" in the blood fat in ordinary cases, during the two or three days following narcosis. This he believes may be due to necrosis of the tissue cells with liberation of their fatty constituents. In two fatal cases, one from ether and one from chloroform, there was a sharp rise in the blood fat which continued until the death of the animal. With alcohol there was a slight increase in the blood fat in the course of 8 or 9 hours. With morphine there was no appreciable rise during the first eight hours, but a considerable after rise in the course of the next two days.

METHODS

In carrying out the investigations, certain standards have been followed quite uniformly. Complete accuracy cannot be claimed in counting the particles. It is much like trying to count the flakes during a snow storm, since the particles are in active motion; yet even in a snow storm a fairly accurate estimate may be made of the number of snow flakes passing by a screen of a known limited area, and from this may be judged the number in a proportionately larger area. In these investigations the field in which the particles were counted was that included in the boundary lines of an ocular micrometer. By comparison with a stage micrometer the value of the spaces of the ocular micrometer can be determined and its proportionate area of the whole microscopic field. In this instance the

ocular micrometer area represented about one-tenth of the whole field. In focusing, a level was reached which showed the particles to the best advantage, and this focus was not changed while the count was being made. Only those particles were counted which showed the Brownian movement. In this way it was hoped to exclude particles of dirt or foreign material which might adhere to the slide or cover-glass. Each figure upon which the curves are based represents the average of the number of particles counted in five ocular micrometer fields.

TERMINOLOGY

The term *micron* has for a long time been used as a unit of measurement for microscopic objects. It represents one-thousandth of a millimeter. Despite its use for this purpose, it has, in recent years, also come into use to designate minute particles in colloid chemistry and in connection with the dark-field and ultra-microscope. Because it has been more or less generally adopted, and its use seems to be extending, the term chylo-microns has been introduced by Gage to designate the particles found in the blood and chyle, since the particles are of the same nature in both fluids, and the name fittingly indicates their origin. For the particles found in milk the term galacto-microns and for those found in the semen or sperm the term spermato-microns is suggested, the prefixes indicating the nature of the fluid in which they are located.

HISTORICAL SUMMARY

The milky appearance of blood serum sometimes found was described by Boyle in 1665 (Philos. Trans., Vol. 1). The person had eaten a hearty meal four hours before being bled, and Boyle says: "The blood was white on top as if half chyle." Hewson also in his work on the blood, 1770-73 (Philos. Trans. and Works), showed in the clearest manner possible that the white serum might be due to the chyle poured into the blood, and that the whiteness was due to exceedingly fine particles of fat. When he dried this milky serum "the oil oozed out so much as to make the paper on which it was kept greasy."

Gulliver in the Dublin Medical Press, 1840, in an appendix to his translation of Gerber's General Anatomy, 1842, and in his notes to "The Works of William Hewson," 1846, gives further evidence and many references to medical writers showing that the milky appearance of the blood serum after a mixed diet was due to the chyle.

He shows too that the particles of the fat emulsion in the chyle and after being poured into the blood are nearly uniform in size, measuring from 1/24,000 to 1/36,000 of an inch in diameter. This agrees remarkably closely to the latest accurate measurements. He also states that these minute particles are in constant, active Brownian movement. Gulliver named the particles the "molecular base of the chyle."

While it is possible to see the minute particles in the chyle and blood by the bright-field microscope, Dr. James Edmunds in 1877 (Monthly Micr. Jour., Vol. 18, p. 82) showed the great superiority of the dark-field microscope for the purpose. He says: "Blood and saliva may be seen as new objects [with the dark-field microscope]. * * * The [blood] serum is seen filled with a nebulous haze of points, as is mote-laden air in a sunbeam or in the electric light." In 1907 Dr. Alfred Neumann (Zentrlb. für Physiol., Bd. 21) also used the dark-field microscope as had Dr. Edmunds. He also noted the minute particles and roughly estimated their number in different conditions as few, many and very many. He followed Hewson and Gulliver in attributing the particles in the blood serum to the chyle.

In 1918-20 we undertook an extended study of the blood with the dark-field microscope, and among other things, the determination of the origin of the free particles and their dependence upon the food ingested. By means of the eye-piece micrometer, as previously stated, quite accurate counts of the particles present in the blood under various conditions of food and digestion were made. We also used definite weights and kinds of food and continued the experiments from a period of fasting through an entire digestive cycle until the number of particles was as at the beginning. This usually required about 24 hours for a complete cycle, the blood being examined every hour.

We proved that the particles were fat, as had Hewson, by obtaining the grease spot on paper, by extracting the dried serum with ether and other fat solvents (xylene, benzene and chloroform). The extracts were dried and then stained with Sudan III and with osmic acid. Finally we fed cats and dogs with olive oil or butter stained with Sudan III, and found the chyle and the blood serum stained pink. This serum and chyle were likewise extracted with ether, etc., and the pink fat thus obtained was used to produce a grease spot upon paper, and to have superposed upon it the black stain of osmic acid. We are therefore certain that the milkiness is due to a fat

emulsion in the chyle and in the blood serum. We likewise found that with normal animals no milkiness of the chyle or of the blood serum was ever produced unless the ingested food contained fat or one of the fat constituents, viz., fatty acid or glycerin.

That there might be a milkiness of the blood serum in cases where very little or no food had been taken was pointed out as early as 1736 by Stuart (Philos. Trans. R. S., 1735-36). Such a condition is now known as lipemia. Hewson (1770-73, Philos. Trans. and Works) also discusses milky serum where fatty food had not been taken, and concludes that the fat has been absorbed from the fat reservoirs of the body.

REMEDIES FOR CHICKEN LICE

EXPERIMENTS to determine what substances are best for exterminating or keeping under control chicken lice have recently been made by the Government. The following powdered substances were found to be effective when used as dusts: Arsenic trioxid, barium fluorid, barium tetrasulphid, borax, boric acid, cloves, naphthalene, paradichlorobenzene, sabadilla seeds, sassafras bark, sodium fluorid, flowers of sulphur, and refined sulphur. Only a few of these materials, however, can be considered of any practical value in the control of chicken lice. Arsenic trioxid is too poisonous; barium fluorid, cloves, sabadilla seeds, and paradichlorobenzene are too expensive, or not readily available in large quantities; naphthalene is dangerous if applied too freely, and barium tetrasulphid does not kill all the lice. Sodium fluorid is the most practical remedy given in this list.

The following materials were found to be of no value against chicken lice in spite of popular opinion regarding many of them: Angelica root, calcium carbonate, calcium fluorid, calcium hydroxid, calcium oxid, calcium sulphate, colocynth pulp, diatomaceous earth, dolomitic lime, eucalyptus leaves, ferrous oxid, flour, wheat, gypsum, hellebore, lime (air slaked), lime (water slaked), magnesium carbonate, magnesium oxid, magnesium silicate, orris root, quassia chips, road dust, silica, sodium bicarbonate, vermilion, yellow ochre.

The fact that 26 different finely powdered materials—7 organic and 19 inorganic—were found to be of no value shows the fallacy of the old idea that any fine powder is effective against chicken lice if dusted into the feathers.

THE SUSCEPTIBILITY OF YOUNG PIGS TO HOG CHOLERA[1]

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WITH the discovery of the Dorset-Niles anti-hog-cholera serum a great step in advance was made in the control of the most serious disease of swine, namely, hog cholera. This discovery, like all others of its kind, in no sense gives man a complete mastery of the subject. Instead it allows him to come one step nearer that goal. The fact is, the solution of a problem simply gives us so much more knowledge with which to combat our enemies. Further, and more important from the standpoint of the advancement of science, it opens up new avenues of thought and presents other problems for research, the solution of which may be taken as the milestone of our progress.

One of the greatest problems, and from certain angles absolutely the most important one, arising from the discovery of the anti-hog-cholera serum, is the proper method of handling young pigs. It is hardly necessary to state that there is a great diversity of opinion on the subject. This is probably due to the fact that the information of the average individual in this field is apt to be based on certain specific cases and not on the average results obtained from a great number of herds. In fact, it is possible for one person working with a litter of young pigs to obtain results diametrically opposite from those observed by another worker with a different litter at the same age and under apparently identical conditions. It is generally conceded that pigs born of and suckling immune mothers are much more apt to withstand the virus of hog cholera than those of susceptible mothers. This statement, however, does not always hold true, as numerous exceptions have been noted both in pigs from susceptible and immune mothers.

The problem is not even so simple as this. It is still further complicated by several other factors. One of these is the belief by many persons, which is supported to some extent at least by experimental data, that from 12 to 14 per cent of all hogs have a natural immunity. Further, do small and especially baby pigs react to cholera in the same manner as adults? Or, in other words, does

[1] Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

cholera always produce a permanent immunity in those pigs, or is the immunity apt to be of a transitory nature?

Next, if we assume that young pigs are susceptible, we are reasonably safe in concluding that serum alone will produce a passive immunity. If this is true, what is the duration of this immunity? Also, if the pigs have a passive immunity at the time of treatment, what are the effects of the serum? Again, what are the effects of the simultaneous treatment under these conditions? In regard to this point, Dr. Cahill, in a recent article in our JOURNAL, records results obtained from several hundred pigs, which would indicate that only a certain percentage of these animals retain a permanent immunity from this treatment. On the other hand, Niles and Ritz report in a later article data which would lead us to believe that the vast majority of young pigs are permanently immunized by the administration of serum and virus.

These statements at first glance would appear to be diametrically opposed. On careful analysis, however, we find what to our minds is a reasonable explanation of the differences in results. It is the fact that the pigs used by Cahill were fed on a garbage diet and hence were under exposure to extreme infection practically all of the time. The animals of Niles and Ritz were not garbage fed and hence did not need the same degree of immunity for their protection. To put the proposition briefly as we see it, the hogs of Cahill were kept under special conditions and therefore needed a greater degree of immunity for their protection. The pigs worked upon by Niles and Ritz were kept under conditions more nearly simulating those of the average farmer, and that is in the last analysis our greatest concern.

In another experiment which we are conducting, under conditions comparable to those on the average farm, our findings to date seem to coincide with those obtained by Niles and Ritz. Undoubtedly they would not hold in a garbage-feeding plant.

Other questions which demand solution are whether or not we are warranted in using the so-called "sero-simultaneous" method of immunization. It also is important to know whether the immunity is largely transferred by the mother to the pigs at birth (true natal immunity), or whether a large per cent of it is obtained through antibodies present in the mother's milk. And last, if either or both of these types of immunity exist, is it possible to build an active or higher passive immunity upon either or both of them?

It is obvious that our reason for propounding these questions is not for the purpose of presenting experimental data toward their solution, nor would it be wise to waste the time of this meeting in presenting our ideas or pet theories, as these are worth no more than those of other workers with the same amount of experience in this field. The purpose, however, is to get these questions firmly in our minds and to determine from them if possible the really basic or fundamental problem involved.

After careful consideration of the foregoing, the logical procedure seems to be to start with the pigs at birth or as soon after birth as possible, and to determine the percentages of those animals which are susceptible or immune at that time. The age at which the immune at birth become susceptible, if they do, should also be determined. These projects, with certain modifications, are therefore taken as our problems, with the hope of adding more data to those already accumulated, and thus to throw a little more light upon an important question.

Unfortunately, susceptible sows do not readily lend themselves to this class of experimentation. Our data are therefore from necessity based entirely upon pigs born of and suckled by immune mothers.

PREVIOUS LITERATURE

Reymann has recently published an article on "The Transfer of the So-called Normal Antibodies from Mother to Offspring" (agglutinins). This work does not have a direct bearing upon our problems, as another species of animal and still another type of antibodies were involved. Indirectly it is worth considering, as will be brought out later. We are therefore quoting the summary, as follows:

"1. By examining the transmission of the agglutinins normally occurring in the blood from the mother to the offspring in goats, I have only in one case of fourteen been able to prove their recurrence; in all others the kids were born without agglutinins and probably derived it from the mother animal through the milk, in which it is to be found accumulated at parturition. From the milk as from the kid's serum it disappears in the course of a few days; then follows a period of a few months in which the blood of the kid is free of agglutinins, and then it appears again, probably in consequence of an immunization from the flora of the digestive tract. The research was concerned with coli and typhoid agglutinins as well as agglutinins against rabbit and horse corpuscles.

"2. In the blood of the kid there was in some cases more, in others less of the normal antibodies than in the blood of the mother

animals, and only in one case the blood of the kid contained more than the colostrum, so that it is not possible to deduct any quantitative rule from these experiments.

"3. In the colostrum the titre was higher than in the serum of the mother animal.

"4. By nursing experiments it was shown in one case that the agglutinin is probably transmitted to the kid through the mother's milk. In another case the result was questionable.

"5. The agglutinin maximum in the blood of the kid may occur as early as eleven hours after birth."

Minkler finds: "The claim that suckling pigs from immune sows carry such immunity during their nursing period was not verified, for losses were recorded among suckling pigs nursing immune sows, although the sows themselves were perfectly healthy."

McArthur reports the following experiment:

Pregnant sows which had not been exposed to the disease were given the Dorset-Niles serum with virus and kept in sheds with concrete floors until after the litters were weaned. In a few instances the serum only was used. The litters were exposed in different ways to hog cholera to test their immunity.

The results of the experiments would indicate that sows actively immunized against hog cholera transmit their immunity to their young. A large percentage of the pigs remained immune as long as they were suckling and the sows were immune. When the sow contracted the disease the young pigs did not usually survive more than a few days. There was considerable variation in different pigs of the same litter. As the immunity was found to last only a few weeks after weaning, the author considers it advisable to vaccinate pigs just before or shortly after weaning. Second litters were found as highly immune as first litters in all cases and in some cases even more highly immune. The above data were secured from 31 litters covering a total of 179 pigs, of which 39 succumbed during the course of the experiments. Of these only 15 showed cholera lesions, giving an immunity of 91.7 per cent of the pigs under observation.

Birch reports a case in which a sow was immunized as a young shoat. Later she was hyperimmunized and bled for serum four times. Soon after the last bleeding she was found to be pregnant, so she was not rehypered. In due time she farrowed 4 pigs, one of which was killed the following night. The sow and remaining pigs were placed in an infected house. One died at the age of 27 days. Postmortem examination failed to reveal cholera. The other two died on the thirty-first and thirty-seventh days, respectively. One

showed a few petechiæ and the other presented extensive lesions of hog cholera.

Birch in another article seems to believe that the difference between young pigs that receive permanent immunity by the simultaneous treatment and those that do not is the absence of natal immunity on the one hand and its presence on the other. He sharply differentiates between passive immunity produced by serum and natal immunity. He also seems to believe that the resistance of the baby pigs is almost or entirely due to natal immunity rather than to antibodies obtained through the mother's milk.

TECHNIC

Animals used in our experiment were not carefully selected, but were taken on from time to time as they became available after the completion of other projects (mostly feeding). None of the sows had even been used in hog-cholera work. They were mostly purebred hogs, although a few grades were included. As to breeding, they consisted of Yorkshires, Tamworths, Duroc-Jerseys, Berkshires and Hampshires. Some were bred straight and others were crossed in more or less of a hit-and-miss manner. Their ages varied from the first breeding to old animals. With one exception they were all immunized by ourselves in the usual manner, the ordinary doses of serum and virus being employed. This exception, sow No. 522, was an animal which came to us with a history of having received the double treatment. As will be noted later, subsequent events have caused us to question the accuracy of this statement.

The sows and pigs were kept in pens or yards large enough to allow them a reasonable amount of exercise. The premises were more or less infected, as they had previously contained hogs suffering from cholera, and no effort was made to clean and disinfect them. A strict self-imposed quarantine was maintained throughout the course of the experiment, which covered a period of approximately two years.

The pigs were tested for immunity at ages varying from 2 to 78 days. This was done by injecting them intramuscularly in the region of the ham with 1 c.c. each of hog-cholera virus. After this treatment the pigs were kept under as close observation as was practicable. The feed for the mothers and for the pigs after they were weaned consisted of different rations selected with the idea of conforming as slosely as possible to that used by the average farmer. One exception, however, was made to the practice of many

swine raisers. This was that the mothers and pigs were not allowed to have corn. No medical or other treatment outside of reasonable care, plenty of water and regular feeding was given either the mothers or pigs during the 30 days during which they were kept under observation. All animals that died were "posted" at the earliest available opportunity and the postmortem findings were preserved.

For purposes of execution the experiment was divided into two parts. The first deals with the suckling pigs and the second with those that had been weaned before they were exposed to the virus. In part 1, 13 litters containing 108 pigs were used. They were exposed to the virus at ages varying from 2 to 55 days, this being about as long as a sow is usually allowed to suckle her pigs. In each litter from 1 to 3 pigs were given both the serum and virus for the purpose of checking the potency of the serum and also to protect the udder in case all the pigs receiving virus should die. This left 85 pigs to receive virus and 23 the double treatment.

While this work was being carried out the question arose as to the degree of immunity retained by the suckling pigs which had received virus. It was deemed advisable to obtain some information on this subject. The pigs of sow No. 10 were therefore selected as an average litter. At the expiration of the 30 days after these animals had received the virus they were weaned and removed from the sow. The 8 pigs and 2 double-treated checks were then given a second dose of 1 c.c. each of virus. The 2 checks and 6 of these pigs showed no signs of cholera from the second exposure. The other 2 pigs receiving the virus took sick and died of cholera. Table 1 presents in detail the data for the suckling pigs.

In the second part of the experiment, where all the pigs were weaned before they received the virus, 6 litters consisting of 48 animals were used. Their ages at the time of receiving the virus varied from 48 to 78 days. In the cases of litters from sows Nos. 2 and 3 the pigs were removed from the mothers and exposed to virus before weaning was completely over. Check pigs were allowed to suckle the sows for the protection of their udders. In the other litters the pigs were completely weaned with the exception of the litter from sow No. 8. In this case the pigs were believed to be completely weaned and were accordingly given the virus after they had been separated from the mother for 24 hours. At the expiration of 48 hours the sow's udder appeared to be full and somewhat painful. The pigs were therefore allowed to suckle once on this day

and once again on the following day. These were the only cases in which the pigs came in contact with the mothers after they had been exposed to the infection. All pigs received the virus in litter groups in from 24 to 72 hours after they had been weaned from the mothers. The details in regard to the weaned pigs are given in Table 2.

DISCUSSION

The results obtained in the case of sow No. 522, Table 1, are probably explained by the assumption that this animal never actually received the double treatment. In case the treatment was administered, it certainly did not hold. This sow came down with the disease in 6 days and the pigs in 4 to 5 days after the mother. The sow and pigs all died of cholera with the exception of the double-treated check. This animal remained healthy throughout the entire period of observation.

The case of sow No. 10 is also especially interesting. The data are not of very much value, as they are based on only one litter. They would tend to indicate, however, that the immunity of the suckling pigs was somewhat increased by the dose of virus, as 6 survived and 2 succumbed to cholera. The checks, double treated at the first exposure to virus, also remained well.

After a careful analysis of the data in Table 1, and especially if we are permitted to ignore the results obtained from the litter of sow No. 522, we find that not only all of the checks but all of the pigs receiving the virus alone showed no visible signs of cholera. We do not believe the sows with which we worked possessed any more immunity than the average double-treated animals, but undoubtedly if a larger number of animals had been used a small percentage of breaks would have occurred. The fact that these animals were kept on more or less infected premises may have aided in increasing their immunity to some extent. This increase, if it occurred, could not have been very material, however, as it failed to protect the weaned pigs noted in Table 2. It is also true that the weaned pigs had almost or entirely lost their natal immunity or that obtained through the mother's milk.

In the suckling pigs it was impossible to distinguish any difference in the degree of immunity possessed by the different litters or by individuals of the same litter, as, with the exception of pigs of sow No. 522, none of them contracted the disease.

In Table 2, giving the data of the weaned pigs, sow No. 8 seems

TABLE 1.—SUCKLING PIGS

Number Pigs in Litter	Sow No.	Breeding	Age at Exposure	Number on Experiment	Quantity of Virus	Checks Double Treated	Number on Experiment Discharged	Checks Discharged	Time under Observation (Days)	Died of Cholera	Chronic and Recovered Cases
11	5	Yorkshire to Tamworth boar.	2 days	9	1 c.c.	2	9	2	30	0	0
8	11	Duroc to Duroc boar.....	9 days	6	1 c.c.	2	6	2	30	0	0
10	2	Yorkshire to Tamworth boar	15 days	8	1 c.c.	2	8	2	30	0	0
6	238	Duroc to Duroc boar.....	16 days	5	1 c.c.	1	5	1	30	0	0
4	6	do.....	26 days	3	1 c.c.	1	3	1	30	0	0
8	4	do.....	28 days	6	1 c.c.	2	6	2	30	0	0
8	16	do.....	28 days	6	1 c.c.	2	6	2	30	0	0
9	1	do.....	30 days	7	1 c.c.	2	7	2	30	0	0
10	500	Berkshire to Duroc boar....	31 days	7	1 c.c.	3	7	3	30	0	0
10	8	Hampshire to Yorkshire boar	36 days	8	1 c.c.	2	8	2	30	0	0
7	7	Hampshire to Duroc boar..	40 days	6	1 c.c.	1	6	1	30	0	0
6	522	Tamworth to Duroc boar...	40 days	5	1 c.c.	1	0	1	30	5	0
11	14	Yorkshire to Tamworth boar	55 days	9	1 c.c.	2	9	2	30	0	0
108	13			85		23	59	23		5	0

TABLE 2.—WEANED PIGS

6	8	Yorkshire to Yorkshire boar.	48 days	6	1 c.c.	0	0	0	30	5	1
9	2	do.....	55 days	8	1 c.c.	1	0	1	30	8	0
12	3	Yorkshire to Duroc boar....	58 days	10	1 c.c.	2	0	2	30	10	0
8	141	Duroc to Yorkshire boar...	69 days	8	1 c.c.	0	0	0	30	6	2
7	173	Duroc to Duroc boar.....	73 days	7	1 c.c.	0	0	0	30	7	0
6	468	do.....	78 days	6	1 c.c.	0	0	0	30	5	1
48	6			45		3		3		41	4

to be the only one which demands special attention. In her case the pigs were allowed to suckle for a short time on two days after they had received the virus. These pigs were slower in breaking than those of the other litters. They also lived a little longer than the average, and all but one finally died. The exception contracted cholera with the rest, but recovered from a more or less typical chronic form of the disease.

The general results in this part of the experiment are materially different from those recorded in Table 1. Here the checks were the only animals which did not contract the disease. Out of 45 pigs 36 died and 5 cases were discharged after 30 days, partial or practically complete recoveries having been observed. Here again, as in Table 1, it is to be expected that if a larger number of animals had been used our results would not have been so uniform. A few exceptions would undoubtedly have been noted.

The only factors denoting a difference in the amount of the immunity possessed by different litters and individuals of the same litter were a slight variation in the duration of the period of incubation, the difference in the number of days the pigs were sick before they died, and the severity of the disease. All of these conditions were undoubtedly greatly influenced by other factors, such as the physical condition of the animals at the time of exposure, the virulence and rapidity of the absorption of the virus, etc. With the exception of the pigs from sow No. 8, there were only 3 cases which survived out of the 6 litters. Generally, the pigs began showing symptoms from the fifth to the twelfth day, and 6 days after the sickness was noted they were usually dead. Of those that died, we only had pigs from the litter of sow No. 8 to live more than 20 days after they had received the virus. The difference in immunity of different litters or individuals was therefore not very great.

In comparing our results with those of other workers we seem to note at first glance a great variation of findings. After a more careful study, however, with one or two exceptions, they all appear to lead in the same general direction.

According to Reymann, in the goat the antibodies with which he dealt seemed to be transferred largely through the colostrum of the mother's milk instead of being obtained from the mother at birth. Birch, in dealing with hogs and the cholera antibodies, is inclined toward the other stand. Our data on this point, unfortunately, do not start until the pigs were 48 hours old, and again, according to Reymann, an animal may reach its highest immunity as early as the

eleventh hour after birth. Neither have we positive evidence to show that the immunity increased or decreased toward weaning time. The fact, however, that our pigs seemed to withstand the exposure to the infection equally well at different ages until weaning was in progress would tend to indicate that the mother's milk played some part in the continuation of the immunity. The fact that the division between the immunity and the susceptibility at weaning time was so sharply marked would also tend to bear out the previous statement.

Minkler's findings appear to be absolutely at variance with ours. We failed to obtain his article, but in the abstract available the number or percentage of young pigs which broke with the disease was not given. If this percentage was very low his findings may still have been along the general trend. The results obtained by McArthur coincide with ours in nearly every particular.

The case of the hyperimmune sow reported by Birch from which the young pigs died of cholera is very interesting. We would undoubtedly have observed similar cases if a larger number of animals had been used. We are inclined to believe from our data, however, that these cases are the exception rather than the rule.

CONCLUSIONS

The results from the data obtained would seem to warrant the following deductions:

1. Many baby pigs born of and suckling immune mothers from ages of 2 to 55 days withstand exposure to 1 c.c. of hog-cholera virus.
2. In case the mother contracts the disease all but the double-treated pigs soon take sick and usually die from hog cholera.
3. Most pigs weaned at ages of from 48 to 78 days which have been born of immune mothers usually contract hog cholera after exposure to 1 c.c. of the virus when not previously immunized.
4. The milk of immune mothers would appear to have some influence in maintaining the immunity of suckling pigs.
5. In case of grave danger or known exposure of weaned pigs to hog cholera, some method of immunization should be employed immediately.

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PROTOZOAN FORMS AND THEIR RELATION TO DIARRHEA AND COLITIS IN SHOATS[1]

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THE presence of microscopic forms of protozoan life in the digestive tract of pigs has been known for many years. The literature shows that the forms found have been studied only in isolated instances, although their identification and classification are apparently quite dependable. While the different genera and species encountered have been mentioned as a possible cause of disease, no special significance has ever been attached to their presence.

During the last year requests have come to the Kentucky Agricultural Experiment Station for information concerning a disease of shoats which is apparently the same as the condition commonly classified as intestinal necrobacillosis, infectious necrotic enteritis, infectious colitis, infectious diarrhea, etc. In studying the cases which have come under our observation during the last six months a careful examination of the bowel content has been made, and the findings have been such as to indicate that it is quite possible that certain forms of protozoan life found in the intestines of swine may be important factors in initiating disease. In all, microscopic examinations of the intestinal contents have been made in 75 pigs.

The organisms encountered have been classified as *Balantidium coli suis* and *Trichomonas suis*. In some of the earlier pigs examined a large motile animal organism was found and identified as an Amœba. Considering this Amœba non-pathogenic, no record of its occurrence was kept. Further, an organism found in the small intestines of several pigs from a single herd and at first thought to be a protozoan is now believed to be a yeast. In smear preparations from the intestinal contents the organism was found in large numbers. It appears as a small round and oval body, considerably smaller than fully mature coccidia, although in some respects resembling them. It stains readily and has a definite cell membrane and a varying granular cell content. Stained preparations from the bowel contents show budding forms quite distinctly.

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[1] Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

In all of the pigs that died, death took place suddenly. The most striking gross pathological evidence of disease was an enormously enlarged liver. The liver was four or five times its normal size, of a brownish mottled appearance and exceedingly friable in consistency. From gross incision almost no blood escaped. Microscopic sections revealed an advanced granular form of cell degeneration, the cyptoplasm of many cells being completely lost. Intralobular hemorrhages were found throughout the liver. None of the organisms found in the intestines have thus far, with certainty, been observed in sections of the liver.

As there was considerable clinical evidence suggesting virus infection, vaccination was recommended, following which losses ceased. Further study of the organism and tissue sections will be made at the earliest opportunity. No attempt was made to cultivate this organism when first discovered, and as it has been found only in the one outbreak, our observations have been made from fixed and stained preparations, except for the preparations that were examined at the time the fresh material was available for study.

As is well known to the veterinary profession and those who have attempted to investigate diseases of swine, the condition designated as intestinal necrobacillosis is exceedingly troublesome. Recognition of the disease in various parts of the country well indicates its increase and spread. It has become established on many breeding farms and in the feed lots of others to the extent of making it impossible to carry pigs through the shoat stage without losses that are economically disastrous to the breeder or feeder. The disease occurs in its most serious and destructive form in pigs from 5 to 6 weeks of age up to 4 and 5 months. Sucking pigs under 5 or 6 weeks seldom contract the infection. Heavy shoats are apparently equally resistant except under very favorable conditions.

The disease is clinically characterized by diarrhea and loss of flesh to the point of emaciation. Pathologically, the most constant lesion is an inflammation of the cecum and colon that, in the later stages, becomes of a typical diphtheritic type, extending over the whole mucosa. Death takes place only after several weeks, except in case of the development of a mixed septicemia.

A summary of the examinations of the intestinal contents indicates that *Trichomonas suis* is found consistently in cases of colitis that show typical symptoms and lesions of intestinal necrobacillosis. *Trichomonas suis* has been found in the feces of a few pigs that did not show marked clinical evidence of the disease; however, many of

these pigs were unthrifty, and all of them came from the open market. A few pigs showing emaciation, examined clinically, did not harbor *Trichomonas suis*, but neither did we find any evidence of colitis. This would seem to indicate that the emaciation, in those cases, was due to other causes; that is, the disease was not so-called intestinal necrobacillosis.

The accompanying table gives the results of the examinations of pigs studied up to this time.

TABLE SHOWING NUMBER AND CONDITION OF PIGS EXAMINED

No.	Disease		Organisms Found			Age	Condition
	Symptoms	Lesions	Balantidium Coli	Trichomonas Suis			
				Non-Motile	Motile		
371	Diarrhea	Colitis	—	—	++++	6 weeks	Emaciated
385	Cholera	Cholera	++++	—	—	3 months	Good
384	Cholera	Cholera	++	—	—	3 months	Good
386	Hemorrhagic septicemia	Hemorrhagic septicemia	+	—	—	10 weeks	Good
387	Diarrhea	Colitis, cholera	+	++	—	2 months	Emaciated
388	Diarrhea	Cholera, colitis	++	++	—	8 weeks	Emaciated
389	Diarrhea	Cholera, colitis	—	++	—	8 weeks	Emaciated
390	Diarrhea	Cholera, colitis	—	++	—	8 weeks	Emaciated
394	Diarrhea	Colitis	—	+++	++	7 weeks	Emaciated
395	Diarrhea	Colitis	+	++	++	7 weeks	Emaciated
396	Diarrhea	Colitis	+	++	++	7 weeks	Emaciated
397	Cholera	Cholera, hemorrhagic septicemia	+	—	—	3 months	Good
398	Cholera	Cholera	+	—	—	10 weeks	Good
400	.....	Septicemia	—	—	—	2 months	Unthrifty
401	Diarrhea	Colitis, hemorrhagic septicemia	—	++	—	2 months	Emaciated
402	Diarrhea	Colitis	—	++	+	9 weeks	Emaciated
403	Diarrhea	Colitis	—	++	+	9 weeks	Emaciated
405	Diarrhea	Cholera, colitis	—	++	—	7 weeks	Emaciated
404	Hemorrhagic septicemia	Cholera, hemorrhagic septicemia	+	—	—	3 months	Good
406	Diarrhea	Colitis	—	++	—	2 months	Emaciated
407	Diarrhea	Colitis	—	++	+	2 months	Emaciated
416	Diarrhea	Colitis	—	++	++	7 weeks	Emaciated
417	Diarrhea	Colitis	—	++	—	7 weeks	Emaciated
418	Diarrhea	Colitis	++++	+++	+	7 weeks	Emaciated
420	.....	Pneumonia	—	—	—	15 weeks	Good
421	Septicemia	Septicemia	—	—	—	12 weeks	Good
423	Diarrhea	Recovered	—	+	—	2 months	Unthrifty
425	Diarrhea	Colitis	—	+	—	2 months	Emaciated
426	Diarrhea	Colitis	++++	++++	++++	9 weeks	Emaciated
427	Diarrhea	Colitis	++	++	++	9 weeks	Emaciated
428	Diarrhea	Colitis	++++	++	++	9 weeks	Emaciated
429	Cholera	Cholera	—	—	—	3 months	Good
432	Diarrhea	Colitis	++	++	—	9 weeks	Unthrifty
439	Diarrhea	Colitis	++	++	++	2 months	Emaciated
440	Diarrhea	Colitis	++	++	—	3 months	Emaciated
444	Diarrhea	Colitis	—	++	++	3 months	Emaciated
445	Diarrhea	Colitis	—	+++	—	3 months	Emaciated
448	Virus pig	Cholera	—	—	—	14 weeks	Good
449	Virus pig	Cholera	—	—	—	14 weeks	Good
450	Virus pig	Cholera	—	—	—	14 weeks	Good

No.	Disease		Organisms Found			Age	Condition
	Symptoms	Lesions	Balantidium Coli	Trichomonas Suis			
				Non-Motile	Motile		
451	Diarrhea	Colitis	+	+	—	4 months	Emaciated
453	Diarrhea	Feces only examined	—	++	—	10 weeks	Emaciated
458	Diarrhea	Colitis	++	++	++	3 months	Emaciated
459	?	?	—	+?	—	3 months	Emaciated
460	Brine poison	Gastritis	—	—	—	10 weeks	Good
461	Brine poison	Gastritis	—	—	—	10 weeks	Good
465	Pneumonia	Pneumonia and colitis	—	+	—	4 months	Unthrifty
468	Diarrhea	Colitis	—	+	—	3 months	Unthrifty
493	Septicemia	Colitis, septicemia	—	+	—	12 weeks	Unthrifty
494	?	On test	—	+	—	3 months	Unthrifty
495	?	On test	—	+	—	3 months	Unthrifty
496	?	On test	—	++	—	3 months	Unthrifty
497	Healthy	On test	—	—	—	3 months	Good
498	Healthy	On test	—	—	—	3 months	Good
499	Healthy	On test	—	—	—	3 months	Good
500	Healthy	On test	—	—	—	3 months	Good
501	Healthy	On test	—	—	—	3 months	Good
502	Healthy	On test	—	—	—	3 months	Good
503	Healthy	On test	—	—	—	3 months	Good
471	?	Gastritis	—	—	—	10 weeks	Good
474	Virus pig	Cholera	+	+++	—	3 months	Good
475	Virus pig	Cholera	+	+	—	3 months	Good
476	Virus pig	Cholera	+	+	—	3 months	Good
477	Virus pig	Cholera	+	+	—	3 months	Good
478	Virus pig	Cholera	+	++	—	3 months	Good
479	Virus pig	Cholera	+	++	—	3 months	Good
463	Dead	Gastritis	—	—	—	3 months	Emaciated
483	Cholera	Cholera, pneumonia	—	+	—	4 months	Good
486	Cholera	Cholera	—	+	—	4 months	Good
487	Meningitis	Enteritis, meningitis	—	+	++	3 months	Good
490	Cholera	Cholera, septicemia	—	+	—	4 months	Fair
491	Diarrhea	Colitis, pneumonia	—	+++	—	4 months	Emaciated
492	Diarrhea	Colitis	—	++++	—	4 months	Emaciated (runt)
506	Dead	Cholera	+	—	—	5 months	Good
507	Dead	Colitis, pneumonia	—	+++	—	5 months	Good

EXPLANATION AND SUMMARY OF TABLE

The plus and minus signs as used in the table indicate the presence or absence of the different organisms and their relative numbers.

Pigs Nos. 385, 384, 397, 398, 429, 448, 449, 450, 474, 475, 476, 477, 478 and 479 were apparently healthy. They had been injected with virus and were killed at the height of the reaction (hog cholera).

No. 506, acute hog cholera, field infection.

Nos. 386 and 404 died of hemorrhagic septicemia.

No. 420, pneumonia.

No. 421 was an apparently healthy pig that sickened and died suddenly.

No. 423 recovered.

No. 459, cause of death unknown. Organism found few in number, identification questionable.

Nos. 460, 461 and 471 were all from the same herd. All died suddenly. Nos. 460 and 461 were first diagnosed as brine posioning. No. 471 died some days later, diagnosis botulism (?).

Nos. 493, 494, 495 and 496 were from the same litter and were purchased for experimental purposes. No. 493 died 48 hours following the injection of anti-hog-cholera serum and virus and castration.

No. 463 clinically showed marked emaciation; did not show colitis; was the only pig examined from a herd of 66, several of which were showing emaciation; all improved following a change of feed.

The remaining numbers in the list, 47 in all, were all clinically typical cases of so-called intestinal necrobacillosis. All but 2 died or were killed and showed extensive colitis, and all harbored *Trichomonas suis*.

A review of the table shows *Balantidium coli* to have been present in 26 out of 75 animals examined; 19 of these showed colitis and 7 did not.

Trichomonas suis, motile and non-motile forms, is found to have been present in 50 out of a total of 75 pigs examined. Thirty-five of the 50 were typical cases of infectious colitis, 5 were unthrifty, and 10 were in good flesh, showing no clinical evidence of the disease. However, they were purchased on the open market (stockyards, Lexington, Ky.).

Trichomonas suis has been found in the contents of the cecum and colon of all pigs suffering with infectious colitis (intestinal necrobacillosis) that we have examined up to this time. It may be found in apparently healthy pigs from infected herds and in pigs purchased on the open market. Further observations are necessary to confirm our findings as to the occurrence of this organism in infected and healthy shoats. The chronic nature of infectious colitis, and the fact that the mortality in infected herds varies from 25 to 75 per cent, depending on the conditions, would seem to show that many apparently healthy pigs harbor the organism.

The nature of the lesions and the frequency of a terminal non-specific septicemia would seem to indicate that various micro-

organisms which have been in varying degree incriminated as the cause of this disease no doubt become very important factors as secondary invaders.

We feel from the evidence available—and by this we mean to include all phases of the disease—that there is quite as much to show that *Trichomonas suis* is the primary cause of this disease (infectious colitis) as there is for any of the different bacteria that have been worked with up to this time. If further study confirms our opinion that *Trichomonas suis* is the initiating cause in intestinal necrobacillosis, infectious colitis, etc., then the name trichomoniasis would be the correct one for the disease.

CULTIVATION OF TRICHOMONAS SUIS

Pig 474.—On July 20, 1920, about 5 drops of the fluid contents of the colon which contained a large number of the non-motile form of *Trichomonas suis* were placed in each of two test tubes containing 10 c.c. water and two containing 10 c.c. normal salt solution. One of each was incubated at 37° C., the other at room temperature. On August 4, 1920, the tubes were examined. Both tubes containing water showed numerous motile forms of *Trichomonas suis*. The two tubes of salt solution failed to show either motile or non-motile bodies.

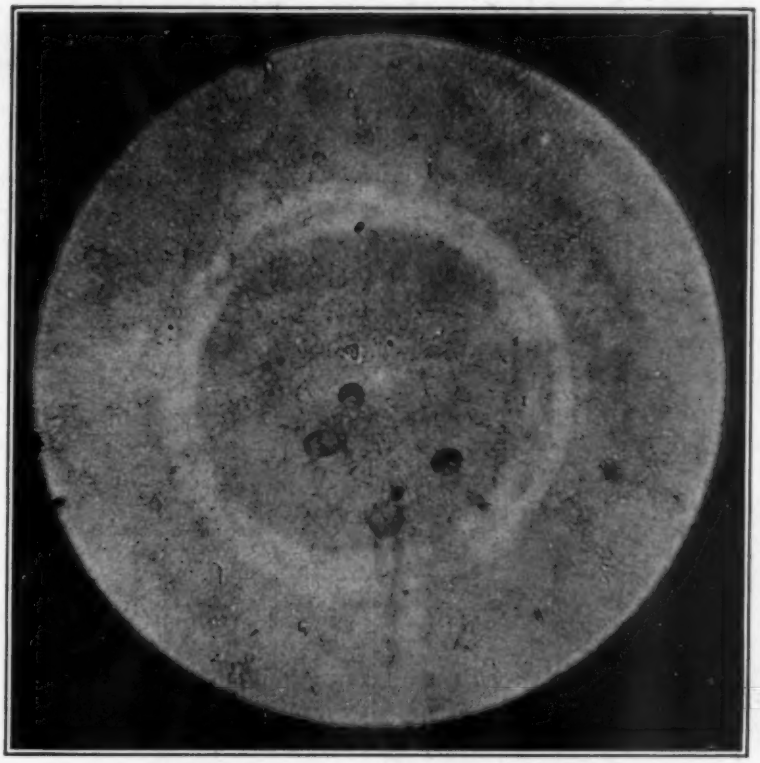
From the water tubes the following transfers were made: Two each of water 9 and pork bouillon 1; two each of water 8 and pork bouillon 2; two each of water 7 and pork bouillon 3; two each of water 5 and pork bouillon 5; two of pure pork bouillon; three of sterile water. One set of each was incubated at 37° C. and the other at room temperature.

On August 10 the tubes which had been incubated at 37° C. were examined. Those containing pork broth did not show any development of Trichomonas. Water tubes showed actively motile, sluggishly motile, and non-motile forms. On August 14 the tubes kept at room temperature were examined. Those containing pork broth did not show any development of Trichomonas. The water tubes showed many actively motile, some sluggishly motile, and a few non-motile forms.

On August 14 transfers were made from water tubes to water tubes.

On August 16 motile forms only were found.

In the tubes containing pork broth bacterial development was extreme, which may have interfered with the development of Trichomonas. In the water tubes bacteria were far less evident.



Microphotograph of Trichomonas suis



A Case of Infectious Colitis. Pig six months old two days before death. Trichomonas suis present in large numbers.

Pig 487.—August 11, 1920, 5 drops of the fluid contents of the colon which contained many actively motile and a few non-motile forms were placed in water tubes (10 c.c.) and incubated at 37° C. On August 14 the tubes showed numerous motile forms. On August 16 the tubes showed many small motile forms.

Pig 489.—August 11, 1920, 5 drops of the fluid contents of the colon which contained many non-motile forms of *Trichomonas suis* were placed in water tubes and incubated at 37° C. On August 14 the tubes showed many actively motile forms. Agar plates from the water tubes were made. Bacterial colonies were numerous but no Trichomonas could be found.

Organisms found in tube of No. 474, incubated at 37° C. for 4 days, were all smaller than those found in the infected pigs. On the tenth day there was apparently little if any increase in size. However, the water tubes of No. 474 left at room temperature, on the fourteenth day after inoculation, showed both motile and non-motile forms to be approximately the same size as those found in infected pigs.

On August 16 the original of No. 489, incubated at 37° C., showed many motile forms, and transfers made on August 14 showed a few motile forms.

Dr. H. Garman, of the Kentucky Experiment Station, to whom some of the material was submitted for examination, reports as follows:

"The flagellate protozoan found in the intestines of pigs under observation at the Veterinary Department of the Kentucky Experiment Station has been examined microscopically with some care in material taken from different animals and submitted by you at different times during the past month. The organism is undoubtedly Trichomonas, and is very similar to the *T. vaginalis* of authors, but may prove to be *T. suis*, to which I have seen a reference. The available descriptions of species of the genus are not sufficient for discrimination of the two species. The group needs overhauling by some one who will critically study and compare the flagellates from different animals, before satisfactory specific determinations will be practicable.

"The motile protozoan was found in some numbers in material from several of the pigs that had died, being especially common in your No. 437. In the single animals (No. 474) killed for examination, the motile form was not observed.

"Spherical, non-motile organisms having an appearance of being of the same nature as those described and figured by Dr. Philip B. Hadley (Rhode Island Station Bulletin No. 166, 1916) from the intestines of turkeys affected with 'blackhead' have proved common in all of the material submitted.

"The only other organisms especially noticeable in the material were: (1) Amœba; (2) the large ciliate protozoan, *Balantidium coli;* (3) the singular oval eggs with terminal plugs, of a worm, *Trichuris* (*Trichocephalus*) *crenatus;* and, of course (4) great numbers of bacteria of several different species."

Infectious necrotic enteritis in shoats has been for so long associated in its occurrence with cholera and hemorrhagic septicemia that it has, at times, seemed almost impossible, clinically and pathologically, to separate definitely these diseases. The fact that all three diseases may exist in a herd of pigs at the same time has been one of the great drawbacks to our understanding the true nature of this condition. That they are definite and specific entities there can be no longer any doubt, and when studied in their true and uncomplicated forms it is found that there are in the history, clinical symptoms and lesions special and distinct features charcteristic of each that can be used with reliance in differentiation. Infectious necrotic enteritis has occurred in shoats known to be immune to hog cholera, that have been vaccinated against hemorrhagic septicemia, and also that have been given so-called mixed-infection vaccine for swine. In case of death, bacteriological tests and animal inoculations have shown that neither cholera nor hemorrhagic septicemia was present. Further, the disease is frequently found among shoats on farms where cholera has not occurred for years nor has vaccination been practiced.

The nature of the disease warrants our looking upon it as a specific condition, capable of occurring independently of other diseases. Infection apparently does not come from contact, but all animals contracting the disease do so from a common source. Pen infection is common and rather constant. However, where a large number are kept together the percentage loss is much higher than when only 10 to 15 are kept in a pen. Losses from the disease usually vary from 25 to 50 per cent of the herd; a higher mortality may now and then result. While the infection apparently exists in dry lots as well as in the presence of moisture, it is quite evident that on wet, muddy grounds the infection spreads more rapidly, the disease is more severe, and the losses considerably higher. Under this condition, and especially in shoats that have just gone through hardships and exposure of shipping, the mortality is not only high but death takes place earlier in the course of the disease, the animal upon postmortem showing evidence, both pathological and bacteriological, of septicemia. In the dry lot the pigs linger and a terminal septicemia is not so often observed.

Bacteria that have been found in association with the inflammatory lesions of the intestines would seem to stand specifically in direct relation as a causal agent of the disease. However, while their presence is more or less constant, a typical form of the disease has never been produced from feeding pure cultures of the various organisms isolated. Vaccination for the prevention of this disease has been extensively carried out under field conditions, both experimentally and commercially, and some benefit may be claimed; but when the animals so vaccinated are subjected to exposure in infected pens the disease will usually occur. Dr. R. A. Craig, of Purdue University, has demonstrated in his experimental work that pigs recovering from an attack of enteritis produced from the feeding of pure cultures of different species of microörganisms isolated from the intestines of swine have later, from pen exposure, contracted a fatal form of intestinal trouble which, upon postmortem examination, was found to be typical of what we understand as infectious necrotic enteritis.

Many animals in the herd may not show any appreciable evidence of sickness, but a careful study will show that practically all have stopped growing, and it sometimes requires weeks for them to get back to a full growing state of health. Therefore the animals that sicken from the condition and the losses that follow vary considerably in different outbreaks, depending upon the conditions and way in which the herd is handled and treated.

A review of a few herds in which it has been possible to study first hand every detail of an outbreak may be of interest and value.

Herd No. 1.—Investigated during August, 1913. Sixty-nine spring shoats in a dry lot, in one end of which there had been during the spring considerable water. Shoats receiving oats and corn. Approximately 50 per cent of the animals became extremely emaciated, dying only after several weeks' sickness. The owner of these pigs had been on this farm for nine or ten years, during which time there had never been any cholera, nor had he ever vaccinated against cholera. The pigs were raised on the farm.

On postmortem all pigs showed an extensive inflammation of the cecum and colon. The liver and spleen were in a state of atrophy. Kidneys showed a mild chronic interstitial nephritis with now and then a small hemorrhage. Microscopic sections of the liver and kidneys revealed a very granular condition of the protoplasm of the cells. No other gross evidence of disease in the internal organs was to be found. The loss in this herd was 50 per cent. Other pigs apparently remained well or recovered without treatmeant. Most of the pigs that were sick were killed. Culture tubes inoculated

from the blood and internal organs of pigs killed in an advanced stage of the disease failed to show bacterial growth.

Herd No. 2.—Investigated during July and August, 1919, and during June and July, 1920. Losses have occurred on this farm from this condition for the past ten years. During this time virus infection has been present and the simultaneous method of vaccination has been carried out every year. It has been a problem to determine where the virus infection ceases to be a factor as the cause of death. It has become a custom on this farm to vaccinate the young pigs twice by the simultaneous method, due to the uncertainty of the presence of virus and the sickness that occurs after weaning. A pig from this herd, which was vaccinated at 4 weeks of age, was found to be sick at about 10 weeks of age. Symptoms were depression, temperature 105, diarrhea. The animal was bled, the blood was filtered, and 2 pigs were injected with 10 c.c. each of filtered blood. They remained well for four weeks; were given the simultaneous treatment for cholera and disposed of. The pigs from which the blood was taken showed extensive lesions of infectious colitis with rather typical lesions of cholera, but limited in extent.

On March 30, 1920, 112 pigs, ranging from 3 to 5 weeks of age, were vaccinated against cholera by the simultaneous method. About May 15, 1920, all of these pigs had been weaned and were placed in a fresh pasture of 10 acres with a small feed and sleeping quarters separate. The sleeping quarters were in a large barn with a floor space of about 40 by 60 feet.

I was called to see this herd of pigs on May 16 and found about 50 per cent of them showing symptoms of sickness. Many of them were carrying a temperature of 105. Ten or 15 per cent were already showing marked evidence of loss of flesh and diarrhea. A number of the pigs died and were autopsied, showing extensive lesions of colitis and rather suspicious lesions of cholera. All the pigs were given the simultaneous treatment regardless of their condition. In all about 50 per cent died, showing extensive lesions of so-called intestinal necrobacillosis. Microscopic examination of the contents from the cecum and colon showed numerous *Balantidium coli* and *Trichomonas suis.*

Herd No. 3.—Examined in June, 1920. Herd consisted of 40 shoats averaging 50 to 60 pounds, 6 pigs about 8 weeks of age still nursing, 3 or 4 old sows and a boar. The suckling pigs and a few shoats were the first to show sickness characterized by diarrhea and emaciation. Postmortem showed extensive lesions of infectious enteritis; almost no lesions of cholera. The intestinal contents from pigs in this herd showed the presence of *Trichomonas suis.* There were so sudden deaths; in fact, the pigs were killed after having been sick for three or four weeks.

Herd No. 4.—I was called to inspect this herd late in June, 1920. The herd consisted of 75 shoats weighing from 60 to 80 pounds, a few small shoats just weaned, and 8 to 10 old sows. The small

shoats were taken sick one at a time, showing marked symptoms of diarrhea, and became more or less rapidly emaciated, dying after several weeks of sickness. The lesions were typical of infectious enteritis with now and then some lesions suspicious of cholera. In the intestinal contents from the cecum and colon were found numerous *Trichomonas suis*.

Herd No. 5.—Composed of approximately 50 pigs, 30 of which were some weeks older than the remaining 20. The oldest pigs were farrowed in March. They were kept on a cement floor in small pens until about May 1. In May they were allowed to run out on wet grounds. Were vaccinated at 3 or 4 weeks of age by the simultaneous method and revaccinated by the same method 6 weeks later. About 50 per cent of the 30 were lost and showed upon postmortem extensive and characteristic lesions of infectious enteritis. Numerous motile and non-motile forms of *Trichomonas suis* were found in all of these pigs. The 20 pigs in this herd which were farrowed about the first of May were kept on a cement floor until July 15. They were vaccinated twice by the simultaneous method. Only one pig (463) contracted colitis and died July 24, 1920. *Trichomonas suis* were numerous in intestinal contents. On August 18 about one-half were beginning to show clinical evidence of the disease. It should be stated that in Herd 5 about 50 per cent of the pigs farrowed during the last ten years, including both the spring and fall farrowings, have been lost from this disease.

Herds 2 and 5 have always been handled as cholera-infected herds, and it has never been considered possible to carry pigs through by one vaccination; that is, if they waited until the pigs were weaned before vaccinating them, they would die of cholera and enteritis at from 4 to 7 weeks of age. If they were treated by the simultaneous method at 3 or 4 weeks of age they invariably became sick some weeks later or about weaning time, always showing more or less suspicious symptoms and lesions of cholera plus colitis.

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RINDERPEST IN POLAND

REPORTS from Poland indicate that a serious outbreak of rinderpest is spreading throughout that country. Apparently the disease appeared only after the late offensive by the Bolsheviks, and investigations seemed to indicate that it was introduced into Poland deliberately by the Soviet Army, which is alleged to have driven herds of diseased cattle before it. The Chief of the Veterinary Department of the Polish Ministry of Agriculture believes that there is danger of the disease spreading throughout Europe unless immediate steps are taken to prevent it. Poland by itself is unable to check the infection and it has therefore appealed to other countries for aid, particularly for veterinarians, motor cars, disinfectants and medical supplies.

NEW BULLETINS ON ANIMAL BREEDING

TWO publications which have recently appeared should be found interesting and useful to the veterinarian who wishes to be well informed on the principles of animal breeding. One is Farmers' Bulletin 1167 on "Essentials of Animal Breeding," by George M. Rommel, which presents in simple language the rudiments of breeding and heredity and tells how to apply them in practice. The other, Department of Agriculture Bulletin 905, "Principles of Livestock Breeding," by Sewall Wright, goes deeper into the subject of genetics and treats it in a more thorough and technical manner.

FIELD OBSERVATIONS IN THE CONTROL OF INFECTIOUS SWINE DISEASES[1]

By M. JACOB, *State Veterinarian, Nashville, Tenn.*

WHEN requested to present a paper before this section I decided on a subject which has been the outstanding topic during almost every similar meeting during the past few years. Since there have been nearly as many different opinions advanced as there have been meetings, it was felt that at least one more could do no particular harm. To say the least, the trend of events during recent years, especially within the past three or four, has not been conducive to settled feelings regarding the various phases of infectious swine diseases. It has not been an uncommon occurrence to hear highly efficient veterinary practitioners unhesitatingly admit that they were at sea on this great question, and if one were to draw conclusions from the utterances of those whom we are inclined to recognize as specialists, there is considerable excuse for those who are dependent upon the latter.

In presenting this subject I have taken the liberty of covering a rather broad field, but with the purpose of stressing those influences which, in my mind, are present-day factors in the control of these diseases. During this period the question of diagnosis has apparently become unusually difficult, previous to which most of us had no hesitancy in declaring hog cholera, based on what we then considered unmistakable indications. The profession as a whole does not enter the hog lot with the same air of confidence as has been the case heretofore, and unfortunately in many instances this has created a misapprehension on the part of the owner. It appears that the same influences which have created the feeling of uncertainty among the profession have had a similar effect on the swine breeders, and they, too, have erred in a way which probably would not have occurred previous to the time when the diagnosis of infectious swine diseases became such a disturbing question. Some might argue that we must be on the right track, otherwise the prevalence of the various swine infections would now show a decided increase rather than a decrease; but it should not be necessary before an organization of this kind to rehearse the things which have been and are now serving as factors tending to minimize the spread of infectious diseases.

[1] Presented at the Fifty-seventh Annual Meeting of the American Veterinary Association, Columbus, Ohio, August, 1920.

On the other hand, I do not believe the subject under discussion would be complete without some reference to those influences which, in my mind, have been responsible for what has really been a chaotic situation. I say it has been for the reason that we are returning to the original path of progressive thought and action almost as rapidly as we left it. Probably the greatest factor in the upheaval was the term "mixed infection," and it would be a difficult matter to estimate in dollars and cents the loss which could be attributed to its adoption. Page after page has been written and innumerable discussions have taken place in an effort to explain its meaning and justify its usage, but to me it is about as blank as ever. Misery loves company, and consequently I have been elated on more than one occasion in finding others who were equally as dull of comprehension. It may be that someone will volunteer this much-desired information during the present meeting, and if so, I am open to conviction. I tried from the beginning to grasp its real meaning, with the hope that an advanced step had been made which might simplify and at the same time strengthen our work on the control of infectious swine diseases; but following what I presumed were the teachings of its sponsors failed to accomplish the desired results.

In reviewing the situation as it has occurred during the past few years, it now seems absurd that we should have permitted ourselves to deviate so markedly from what we now reflect as a better line of thought. Of course, we should all admit that there is more than a single infectious disease of swine; but from observations covering the work in our own State—and I don't believe it differs much from others—we are giving the principal recognition to hog cholera, swine plague and necrobacillosis, but with the former (hog cholera) as the one of paramount importance. I will repeat, as I have on previous occasions, that with hog cholera eliminated the others would in comparison be almost a negligible factor in our work on disease control. Furthermore, up to five years ago swine plague as an entity would have been given but little consideration. This disease, which has also been referred to as hemorrhagic septicemia, infectious pneumonia and swine influenza (or "hog flu"), has appeared as an epizoötic throughout a large number of States. Some have objected very strenuously to the use of the term swine influenza or "hog flu," but there are several reasons why these terms are not at all inappropriate. But name it what we may, such an independent disease did appear, and singularly so during practically

the same period as that of human influenza. This statement should not be interpreted, however, as indicating any direct similarity between the causative organisms, as at this time I have no absolute proof to that effect. I am reasonably sure that if swine plague in its recent form had not made its appearance our original attitude toward hog cholera would not have been led astray to such an unlimited extent. But it soon became apparent to us that some definite guidance on differential diagnosis and acceptable treatment was absolutely urgent and essential in order to offset the influences which were clouding rather than clearing the question of disease control.

Experience with only a very few herds was sufficient to impress the importance of disregarding what we thought was meant by "mixed infection," and as yet we have had no cause to question our conclusion in this respect. As previously stated, we felt that to center our efforts on hog cholera, swine plague and necrobacillosis infection was quite sufficient, and so directed our work. After regaining our bearings we had no hesitancy in making investigations and venturing a diagnosis on what we have accepted as being conclusive evidence of the respective diseases, and in October, 1918, our Cholera Control Division, working in coöperation with representatives of the United States Bureau of Animal Industry, offered a chart on differential diagnosis, from which up to the present time we have not found it necessary to deviate to any great extent. The chart, as included herewith, evidently appealed, in part at least, to others interested in this work, as charts bearing the ear-marks of similarity have since then made their appearance from various sources.

It might be well to say here that hog cholera today is no different from what it was ten years ago, and any effort advanced to the contrary is, to say the least, misleading. I realize that even though much has been accomplished, our knowledge on some phases of the disease is comparatively meager, but I feel, as I dare say most of you do, that the future has some startling revelations in store for us.

When swine plague, or whichever name we wish to adopt, made its appearance as an epizoötic, it gave us an opportunity to make some unusual observations and to draw conclusions which were far-reaching in effect. The suddenness with which it appeared seemed for the time being to create baffling situations and no doubt was responsible for unusual losses from hog cholera which would not

DIFFERENTIAL DIAGNOSIS OF INFECTIOUS SWINE DISEASES

	HOG CHOLERA	SWINE PLAGUE	NECROTIC ENTERITIS
Early Indications	Relatively small number sick at beginning. Marked depression. Very inactive.	Sudden onset. Relatively large number sick at beginning. Depression not extreme. Chilling.	Depression not marked. Sick animal active. Very few affected.
General Appearance	Hair rough. Drooping ears and tail. Nose held close to ground. Gaunt. Arched back.	Unless disturbed, will maintain sitting position or lie on breast. Pronounced coughing when made to move about.	Unthrifty. Gradual and marked emaciation.
Appetite	Loss of appetite is partial or complete during course of the disease.	Loss of appetite of shorter duration.	Animal as a rule continues to eat.
Bowels	Diarrhea or constipation; coated dung when constipation exists.	Diarrhea sometimes occurs, but if so, only at the beginning.	Persistent diarrhea. Frequently bloated.
Skin	Red or purplish blotches usually noticed on ears, belly, arm-pits and inside of ham.	Diffuse redness of thinner parts of skin frequently seen during later stage of the disease.	Dry and scurvy.
Gait	Weak or staggering.	Stilty.	Normal.
Respiration	Accelerated and frequently labored during later stages.	Thumps constant.	Normal.
Eyes and Nose	Early congestion of mucous membranes with later discharges.	Discharges profuse during early stage of the disease.	Mucous membranes pale.
Temperature	High temperature maintained during course of the disease.	High temperature of short duration, usually only 2 or 3 days.	Temperature disturbance less constant. Disease may persist with normal temperature.
Medicinal Treatment	No value.	No value.	Yields to medicinal treatment.
Postmortem Lesions	Lymph glands enlarged and hemorrhagic. Petechiæ rounded and well marked over different internal organs such as kidneys, bladder, lungs and larynx. Congestion of lungs or typical pneumonia, but not constant.	Lymph glands slightly congested or normal. Petechiæ irregular in outline and more often limited to lung tissue. Pneumonia constant; area of solidification distributed in patches.	Thickened intestinal walls with white or cheesy-like patches on last part of small intestine and first part of large intestine. Body tissues as a whole are pale.
Vaccination	Treatment with anti-hog-cholera serum and virus positively protects the well hog.	Value of various vaccines and bacterins questionable.	No satisfactory immunizing agent available at the present time.

have occurred under previous conditions. In other words, the presence of swine plague as it then occurred in conjunction with or complicating hog cholera resulted in unusual losses and left many under the impression, when good results from vaccination were not obtained, that the fault was in the quality of serum or virus. But later, when apparent "breaks" occurred, many went to the other extreme and either diagnosed swine plague when, as a matter of fact, they were dealing with hog cholera, or, having previously treated with anti-hog-cholera serum and virus, now proceeded to use the newer biologics, but were still further confused when the latter failed to check the disease.

From this we were able to conclude that a diagnosis should be based on history, symptoms and postmortem lesions, if treatment is contemplated and proper results to be expected. I wish here to lay some stress on history, for while we all appreciate its importance in a general way as an aid in diagnosis, I am inclined to believe the observations of Dr. Robert Jay have impressed this more forcibly than anyone else as an aid in determining infectious swine diseases, especially as to the effect of high-protein feeding and its influence as a predisposing factor on the occurrence of swine plague and possibly other infectious diseases. As an indication of respect for his theory, I may state that almost without exception where swine plague has appeared with us as an entity, the animals affected were on high-protein feeding and with limited exercise, consequently it did not occur to any great extent in our range or thin hogs, but was very prevalent in the fattening and show pens. As a matter of fact it has appeared as a permanent feature during our large fairs for the past three years, and from what I have been able to learn other States have had a similar experience, and as late as the last International Livestock Show at Chicago I observed pen after pen with its fill of "thumpers."

But the interesting thing in this connection is that even though many of these hogs became unusually sick with typical indications of pneumonia, the death rate was very small, not over 3 per cent, and the response obtained by taking the herd off of feed was oftentimes remarkable. Furthermore, treating the animal with the newer biological products, such as swine-plague vaccine, mixed-infection bacterin, etc., either as a preventative or a curative, appeared to be wholly useless. Some might argue that this is purely a digestive disturbance, but the rapidity with which it spreads through the herd, the high temperature and the invariable and constant pulmonary

lesion covering many postmortems, allays every element of doubt as to its infectiousness. But I must state in this connection that while we refer to this disease as swine plague, hemorrhagic septicemia, etc., I venture the opinion that there still remains a missing link as to the real causative organism.

Our investigations covering "breaks" following the use of serum and virus have also impressed us with a constancy of certain conditions. Almost invariably either the serum or virus is indicted as being responsible, but at the same time we find the same serial production has given good results in other herds. The interesting relation has been that with but few exceptions such breaks occurred in herds maintained on high-protein feeding. We already know from unmistakable observations that the virus, when a virulent form of so-called swine-plague infection already exists in the herd, is sure to be followed by disastrous results. Our further belief is that there exists an important relationship between high-protein feeding and susceptibility to the so-called swine-plague organism, especially as to its pathogenicity. If such is the case, does it not open up an avenue of danger to place simultaneously treated hogs on immediate and continued high-protein feeding? At any rate, while this offers an important field for experimental work, we are not overlooking the importance of definite feeding instructions when treating hogs with serum and virus, which should include elimination of high-protein constituents for a period of a least three weeks.

Fortunately necrobacillosis has not been a very serious problem with us, especially not to the same extent as in some of the other States, but here, too, we have been able to draw several conclusions, as with so-called swine plague, having a distinct bearing on hog cholera. To begin with, there should be no difficulty in making a diagnosis of this disease, as the indications are quite typical. In most instances we found heavy parasitic infestations in herds where this disease exists, and quite naturally so, as the environments inducive to either are quite similar. A point which in the past it has been difficult for me to understand was the frequent appearance of pulmonary lesions on postmortem resembling in some respects the lesion of so-called swine plague. This, however, has been cleared up considerably through the recent studies on the life history of the roundworm of hogs by Ransom and others. Treatment for necrobacillosis should be supplemented with an effective treatment for intestinal parasites. For us biologics have failed to give any evidence of efficiency, either as a preventive or curative for necrobacillosis

in any of its forms. The appearance of hog cholera in a herd of pigs where necrobacillosis has existed for some time is quite unusual as the result of casual infection, but on the other hand it is extremely dangerous to use virus in an attempt to immunize against cholera until after necrobacillosis infection has been eradicated. This no doubt explains the frequent loss of pigs when a herd is treated with serum and virus, while at the same time results with the older and more thrifty hogs are good.

Sanitation, including change of location, has proven the most important step in the treatment of necrobacillosis.

Another factor in our control work has been the effect of "feeder" hog movements, both intrastate and interstate, and there is no doubt that where proper precautions have not been observed more outbreaks of cholera could be attributed to such a source than to any other means. I have been extremely interested to know whether the feeder is following a safer procedure to make selections here and there through the country, from herds maintained under varying conditions, with the intention of treating after they reach his premises, or to purchase through recognized public stockyards where the hogs are handled and treated under official supervision. My own opinion is that the latter is much to be preferred and I believe should have the indorsement of those engaged in hog cholera control work. Of course I realize that every movement of "feeder" hogs through public stockyards under official supervision has not been wholly satisfactory, but the percentage of losses is becoming less each year as the method of handling the situation is improved upon. During the period of high prices, when we had unprecedented movements of feeder hogs, both intrastate and interstate, this situation was a great problem in our control work. I can see in the future, as the various stockyards throughout the country become more generally equipped for the proper handling of "feeder" hogs under immediate official supervision, a partial but gradual elimination of at least one dangerous source of hog cholera.

Another influence bearing on future control work is the cost of immunization to the owner. It has been very evident that the treatment of hogs has fallen off considerably during the past year and is primarily accounted for by the general drop in hog prices. This constitutes a grave danger from the standpoint of continuous hog-cholera control work, for the reason that it permits the country to become stocked with a large number of susceptible hogs, and if an unusually virulent epizoötic should make its appearance it would

entail unusual losses before general immunization could be resorted to. We must eventually come to some system which will insure more general treatment irrespective of market prices. Our greatest possibility for the time being lies in the treatment of pigs at an age and weight which will permit the minimum dose of serum. The rather recent announcements by the Bureau of Animal Industry regarding the lasting immunity obtained in the treatment of young pigs are indeed encouraging. If we can say to the farmer with assuredness that the logical time for the treatment of hogs in order to obtain permanent immunity is prior to weaning, it will be the greatest step in recent years toward an effective system of hog-cholera control. Our field observations seem to corroborate the Bureau's conclusions, although the profession as a whole is quite divided in its opinion. It appears to me, however, that an early and definite stand on this point should be taken.

Educational work has also made its impression as one of the essentials in a well-rounded system for disease control and should extend to everyone who is directly or indirectly concerned in the growth and development of the swine industry. The general public must know more about the intricacies of infectious livestock diseases if we hope to effect a real permanent showing, and this can be brought about without trespassing upon the domain of the veterinary profession. I am of the opinion that such a policy works to the advantage of the veterinarian.

I cannot permit this opportunity to go by without some reference to the much-discussed issue, the county agent. I can state unhesitatingly that with us he has been, on the whole, a highly beneficial factor in our control work on swine diseases; this, however, without the agent himself engaging in the actual treating of hogs. It is not my function to defend the county agent beyond the limitations of our own State, but I do believe that much of the fight, if we may call it such, has been misdirected. If the situation in a given State is irregular, it is one that should be remedied within the profession, because our own men are at least in part responsible. We should remember that the county agent represents the Division of Extension, which in turn is a part of the Agricultural College of the State in which he works. With but few exceptions, every State Agricultural College maintains a chair of veterinary science, which is occupied by a qualified veterinarian who is usually a member of this and allied associations. Such institutions have their administrative policies, and it does appear that a veterinarian holding such a posi-

tion should, and usually does, have some voice in outlining policies pertaining to his particular line of work. If he does not, there is something radically wrong. However, I have confidence enough in those who direct our educational institutions and their departments to feel that they will accept and abide by reasonable suggestions coming from their immediate co-worker, the veterinarian. It would seem, therefore, that the logical means of rectifying such an existing evil would be through the veterinarian of the institution from which the misdirected agent is working.

A harmonious working relationship with the various agricultural and livestock agencies is highly essential, and its influence, I dare say, is apparent to those engaged in field work. The rather recent and what is probably the most far-reaching organization is the American Farm Bureau Federation, represented in the various States through the County Farm Bureaus, which makes available a potent organization of inestimable value in control work. But, after all, the one thing that will bind every agency closer to the veterinarian, whether he be a general practitioner or an official, is efficient service. I make these statements based upon observations in the field.

DISCUSSION OF PAPERS ON SWINE DISEASES

DR. A. T. KINSLEY: I was particularly interested in Dr. Jacob's paper on the control of swine diseases. Dr. Jacob put it as most of us believe, that hog cholera is all important, but there are other diseases that must be recognized and need to be controlled. Ordinarily the other diseases are not such a factor from the point of view of fatality, but in many instances are of great economic importance in diminishing flesh and therefore decreasing returns realized from the hogs when marketed. Dr. Jacob apparently accepts that there is such a thing as swine plague, as hemorrhagic septicemia. He states, as others have, that the feeding is a very important factor in the causation of that disease. There is no question that feeding is an important predisposing factor, and from previous experience it would seem that the bipolar organism is the center of attack, and from that fact it appears that there is an infectious causative organism, and thus far no one has demonstrated the opposite. I seriously doubt if necrobacillosis is very important as a factor in the control of swine diseases.

The Doctor correctly condemns the so-called theory of mixed infection in swine. I suspect that what the Doctor terms necrobacillosis is what others call mixed infection. The Doctor does not go into details, and I am wondering if this is the condition which the Doctor calls necrobacillosis or necrotic enteritis.

The stock hog problem is one of the important things that we as veterinarians and particularly the sanitarians must endeavor to solve in such a way that the loss will be reduced in the future. Otherwise the public stockyards and the stock hog proposition are not going to be profitable,

and it is going to remove one of the very nice features we thought had been established. Some years farmers are short of crops, and if the swine can be removed to another part of the country as a stock hog product it is desirable to do so; but if we cannot control the loss of stock hogs, I am inclined to think that they will diminish in the future. This constitutes one of the interesting things, providing masses of literature that might be counted upon in the control of swine diseases.

It has always been my judgment that history is a very important consideration, and further, if there are lesions, we can always count upon certain manifestations in such cases. Coupled with the history of the case, most practitioners, I believe, could more easily diagnose the diseases of swine than in the past. As a matter of fact a great many practitioners do not consider the history of the case.

I want to call attention to another phase. I have visited stock hogs that have been immunized, where serum had been used, and find the practitioner and also Bureau men making diagnoses, certain lesions being the evidence for their diagnoses. Gentlemen, I believe those lesions will be found in practically all hogs from some other cause, in a great many instances that have been diagnosed as cholera. The filterable virus was there, but I seriously doubt, and in some instances where 80 to 90 were lost in some 100 to 300 hogs, I do not believe it is cholera that killed the hogs. We must consider the history, as Dr. Jacob has pointed out.

CHAIRMAN DAY: As Dr. Birch has arrived, we will now hear from him on the discussion of the papers on swine diseases.

DR. R. R. BIRCH: I am not going to discuss Doctor Dimock's paper, because I don't know anything about it. It is encouraging, though, to see careful and thorough work done on the subject of swine diseases, for much of the work during the last few years has been rather superficial and fragmentary.

The veterinary profession is not subject to the same limitation as is the medical profession, for we have experimental animals with which to work, and we are not in as great a degree at the mercy of field trials. Of course eventually all experimental work of this kind must be put to a practical test, but we can learn more about some things in a few months of experimental work than we can in years of field observation.

Dr. Pickens has given us some additional data which we need, but they are just a small part of the available data that apply to the subject. You will all agree that one cannot, as a routine measure in the field, give, as he did, 1 mil of hog-cholera virus alone, and it is in regard to some of these things that we are sometimes tempted to take entirely too limited a view of the situation as a whole. In many herds we will find the young pigs immune, but in others they are not, and in no given herd can we be sure whether immunity or susceptibility prevails. The only safe thing we can do in handling these herds is to assume that they are not immune.

It is a fact that in many large herds, especially those in the East which are fed garbage, we have to provide for protection against cholera before the pigs attain an age of 12 weeks. We do this by giving serum alone before the pigs are 6 weeks of age. What is the minimum age at which pigs may be given double treatment and acquire lasting immunity? Most of us

will agree that pigs 12 weeks old are rendered safely immune in this manner, but there is less unanimity of opinion regarding younger pigs. Supposing, though, that double treatment is administered to pigs 6 weeks old, and that as old hogs 5 per cent of them come back as susceptible, it would be much cheaper to double-treat pigs at 12 weeks of age than to sustain this loss. Some, I know, will take exception to these remarks, for the first serum-alone treatment is not necessary in many Corn Belt herds. It is necessary in most eastern herds that subsist on garbage.

Dr. Benner and I have been working on swine plague during the last year, and I will outline some of the results that we have obtained. All are familiar with the work of Dr. Theobald Smith during the late eighties. At that time nothing was known of the filterable virus, so it has seemed desirable to go over Smith's work again, using for experimental animals cholera-immune pigs. We procured laboratory and field strains of *Bacillus suisepticum,* grew them on artificial media, and passed them through rabbits until suspensions of the organism would kill one over night in very high dilution. We then tried salt solution suspensions of the same organism on immune pigs, using subcutem injections in our efforts to infect. We used between 30 and 40 pigs in groups of 5 and 6 each, and succeeded in producing but one death. Then we tried intravenous injections. We were able to kill pigs in a short time in this manner, but a general septicemia following so closely upon a large intravenous dose of any organism does not prove that it is the primary cause of a specific infectious disease. A few of the pigs killed as a result of intravenous injections showed lesions that could not be distinguished from those due to hog cholera, but such lesions were not the rule. There was a strong tendency for the lesions to localize in the joints, and pigs that survived several days sometimes developed pneumonia. Out of more than 100 pigs exposed by being quartered with our experimental animals, only two deaths occurred as a result.

Just a word in regard to Dr. Kinsley's remarks. I would not want to follow him so far as to say that when a pig dies following simultaneous treatment, showing cholera lesions, we must seek causes for death other than the filterable virus. Under such conditions, although I hate to do it, I claim the pig and admit that I believe the treatment caused its death. It is true that there are many influences and contributing factors connected with "breaks" following simultaneous treatment, but if we could eliminate the part played by the filterable virus in such cases we would be a long way on the road toward clearing up some of the problems that now trouble us.

DR. A. EICHHORN: In regard to the paper of Dr. Dimock, I think we should accept it with certain reservations, since he has not as yet furnished us sufficient conclusive evidence with regard to the etiological relation of Trichomonas in hog infections. Trichomonas are very common everywhere. The fact that successful cultivation is possible in ordinary water proves how widely they must be distributed in nature. We find Trichomonas in the digestive tract of almost every chicken we may examine. I doubt whether they could be or have been incriminated as producing a disease condition in fowls. In view of these facts it behooves us to await

further data before we attribute any pathogenic action to these parasites.

DR. BRUCE: One point might be of interest to Dr. Dimock. I have seen one case of dysentery in a cow that was due to Trichomonas.

DR. A. B. NIVEN: I would like to call the attention of the members to the practitioner's point of view on the subject. The author of this paper apparently is looking at it from the standpoint of the stock-hog men in the yards and the State and Bureau men in charge of this work.

I am located in the Corn Belt of the State of Indiana, and many feeding shoats are shipped in and finished for market on corn and clover. A large part of the work of the local veterinarians in this belt is the immunizing and caring for these hogs, therefore I take issue with the author of the paper just read. If you are going to call the stock hogs into the stockyards to be immunized and supervised by the State or Bureau men, then we, the local veterinarians, will have to go into some other business.

In the last three years I have immunized several thousands of these feeders that were procured in States south of Indiana. I have advised the farmers to go to the country to purchase the required feeders, load them into the cars and ship directly to the home station, never allowing them in stockyards of any kind, and I know that those who have taken this advice have had much better results. From my experience and close observation we have lost practically less than one-half of 1 per cent when these instructions have been carefully carried out.

The reports of the feeders who are quarantined and under the supervision of the State and Bureau men, as to losses sustained among the stockyard feeders, are inaccurate, because they wish to have the quarantine lifted as soon as possible. This is desirable because the quicker they can move the hogs and get them finished for market the bigger the profits.

I claim that the local practitioner is the proper man to handle these hogs, because he is in a better position to serve the feeders. They know where to find him every day in the year. Men who are feeding hogs often desire advice as to the proper methods of handling, feeding and treating these feeders. The men who treat the feeders at the stockyards seldom see the buyer. Therefore I claim that it is not conducive to success to carry out the work from that standpoint. The local veterinarian, who is known personally to the farmer, who knows the farmer and his qualifications as a feeder, and knows his farm and its possibilities and limitations, is far better able to care for these animals successfully.

We must have feeder hogs in our locality. We can raise corn, clover and some pigs, but not enough to supply the demand without keeping breeding stock in the same fields continuously, which is neither advisable nor possible to do successfully because of the danger of infection.

The last three years a great many thousands of hogs have been shipped in from the yards and the country for feeding, and from my personal investigation as the infections of these feeders, which developed after reaching the farms, 99 per cent of the breaks were traceable directly or indirectly to hogs procured from the stockyards.

After certain premises are infected it is necessary to change the feeding location in order to avoid further infection.

About 25 or 30 years ago when we were called to see hogs suffering with cholera we often found that the sick hogs had died before we could reach them. The virus of cholera was apparently very virulent and caused death before the secondary infections developed. This virulence is rarely found at this time. However, the other infections which we are finding in swine and which are causing so much trouble are apparently becoming more virulent and complicated. Any person conversant with these conditions with which we are contending must realize that the only individual who is qualified to differentiate between all these infections is the trained and experienced veterinarian, and then he must have the assistance of the bacteriologist in many cases. Therefore when the Bureau or State sends out young men to diagnose and pass judgment upon the cases which have been under the local veterinarian's care, much trouble is caused and nothing gained by the uncertainty which is left in the mind of the owner.

When a large herd of hogs that have been immuned by the local veterinarian break, possibly many weeks or months later, and a Bureau or State veterinarian makes a diagnosis as being possible cholera, it "gets us in bad" with the farmers. From my limited experience the majority of these cases have been demonstrated to have been a mistaken diagnosis.

A MEMBER (to Dr. Birch): I gather from the discussion that it takes a double immunization to carry pigs through life.

DR. BIRCH: The single immunization carries them to 6 weeks, and the double immunization at 12 weeks of age usually carries them through life.

THE MEMBER: You don't use the double immunization in pigs the first time?

DR. BIRCH: No, sir.

DR. W. L. CHANDLER: Regarding the questions of the probable pathogenicity of intestinal protozoa, I might call your attention to some investigations which I have under way at the Michigan Agricultural College on the treatment of intestinal protozoal diseases of man. A preliminary report of these investigations was published by Dr. E. I. Carr and myself in the *Journal of the American Medical Association* for May 22, 1920. We found that following intravenous injections of 0.6 gram neoarsphenamin, both motile and encysted states of intestinal protozoa would invariably disappear from the stools of man. The results of this treatment appear to be permanent and a number of cases of enterocolitis have cleared up following this treatment. I should like, therefore, to suggest in cases of colitis in swine where a protozoan seems to be the causative organism, and especially in cases where the condition has apparently been induced through feeding the organism to young pigs, that an intramuscular injection of neoarsphenamin be administered; then, if the animal's condition clears up following the disappearance of the organisms, it may be possible to determine whether the specific protozoan observed was in reality the primary cause of the colitis.

As to the size of the dose, I find that swine will tolerate at least six times the maximum dose for man, prorated on the body weight of the animals, and the dose should in most cases be repeated after a lapse of five days. Experiments along this line are at present being conducted in my laboratory at M. A. C.; and although they have not been in progress a

sufficient length of time to enable us to draw definite conclusions, one or two observations have been made which would lead us to assume that at least one organism, *Balantidium coli,* may be responsible for a colitis in swine. Just two weeks ago two runts exhibiting severe diarrhea came under my observation. Each one was given an intramuscular injection of 0.6 gram neoarsphenamin. The organism disappeared from the feces on the second day, and on that day the diarrheal condition subsided. On the fourth day, however, the organism again appeared, but the diarrheal condition did not return. The fact that the organism returned does not indicate that we did not eliminate the organism from the intestine, but was undoubtedly due to a reinfestation, since we did not attempt to keep these animals under strict sanitary conditions. The fact that the diarrheal condition did not return with the reappearance of the organism may have been due to the fact that during the period of absence of the organism the animals were able to establish a resistance sufficient to overcome the action of the organism after it reappeared.

One other point, regarding the probability of various different species of protozoa being able to cause similar types of lesions in animals. I recently observed in a postmortem on a peacock lesions typical of "blackhead." None of the organisms heretofore reported as the causative organism of blackhead were present, either coccidia, amebas, nor flagellates of the genus Trichomonas; indeed the only protozoan organism present was a flagellate belonging to the genus Chilomastix. This was present in both motile and encysted stages, and the cysts were morphologically identical to those of *Chilomastix mesnili* of man. It will surely be a rare occurrence if we find that protozoan parasites of man are able to establish themselves in the intestine of birds; and after all, the possibility of this peacock's having recently had access to infected human feces cannot be overlooked. I have been trying to infest chicks with this organism from man, but so far have not succeeded.

DR. C. H. STANGE: With your permission I would like to discuss for just a moment one of the protozoa which is sometimes associated with enteritis in pigs. I wish to refer especially to *Balantidium coli,* which was observed in considerable numbers in the necrotic areas of a considerable number of cases of necrotic enteritis by members of our research staff in 1918. This is not a new protozoan, it having been discovered by Malmsten in 1857. Considerable work has been done in attempting to produce enteritis in pigs by using this protozoan. Workers have succeeded in producing an enteritis, but in a large majority of cases they failed. They found that only the encysted stage or form transmitted the disease, and because it is so commonly present in hogs it was thought by many that these may serve as a source of infection for men. Brumpt claims to have infected young pigs by using *Balantidium coli* from infected monkeys. The fact that enteritis may be caused occasionally in pigs suggests that there may be pathogenic species as well as harmless ones, but this has not been established. On the whole the *Balantidium coli* seems to stand in somewhat the same relation to enteritis in pigs as the group of organisms already recorded as associated with this disease. Foreign literature contains considerable information in regard to work along the line I have re-

ferred to, but I think we should be very careful in accepting any statements in regard to these matters until they have been carefully worked out.

DR. J. W. CONNAWAY: I believe in progress in investigations, in finding out everything possible under the sun that produces diseases, and always try to add our little in the way of new work or try to prove up on some of the work that others have done.

I think I have given in the past a brief definition of hog cholera and the lesions of that disease. I have also expressed the belief that this is the only disease that we need to consider very seriously in the raising of hogs, aside from those common things like worms and things we might handle by application of ordinary or sanitary measures. I think we should not lose sight of the big thing, hog cholera, and should work as hard as we can to eliminate that disease. You open up a hog where many have died in the herd. This may be the only one you open, and you may not be sure that that farm has been infected with the disease. I don't think we have a lesionless disease, because I believe if we examine microscopically they will be found, but oftentimes to the naked eye there seem to be no lesions. Those lesions are minute hemorrhages. There is a tendency at the present time to call old-fashioned hog cholera by the name of hemorrhagic septicemia.

The pig is a dirty animal; it lives and eats in dirt and is exposed to all kinds of infection. Many of those lesions in hog cholera are secondary troubles or secondary effects. In those small hemorrhages all along the intestinal tract, the dirt germs, the coli germ, the necrophorus bacilli and others have an opportunity to make a sore, or if it is a spine-headed worm you will often find a button ulcer. You will find the worm with the head stuck down into the gut at that point. So I believe many of these things we are trying to inoculate against we could prevent as mixed infections if we will work strong enough to prevent hog cholera. We will not have much trouble with the necrobacillosis or the enteritis group.

DR. DIMOCK: I think we shall always agree that there are other dangerous diseases, and I think it is time that we are arriving at some definite conclusions. I believe this so-called infectious colitis is the second most dangerous disease we have. In some parts of the country it is becoming more impossible to raise pigs and feed them. It is a serious condition and it is one of the next that we must find a way to control. We have had for a number of years lists of organisms that have been incriminated as causing these diseases. These organisms I have mentioned have been known for fifty or sixty or a hundred years, and I do not mean to emphasize the dangers of these other bacilli. We find they are present, but we have found the Trichomonas source, and I say there is quite as much evidence to show that these are the initial cause of disease. We are pinning our faith to the Trichomonas source. I don't say I am right. Whether it is or not has to be proved. When you go to the horse race you pick out the horse you think will win. What you have worked with up to this time has not been satisfactory. If we can find out something that will work, let us go after it.

RECLASSIFICATION REPORT UNJUST TO VETERINARIANS[1]

By J. A. KIERNAN

Chief of Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D. C.

I ENTERTAIN the hope, in which I am sanguine you concur, that the adversity which we have so lately sustained will be only transitory. In my judgment a right decision will depend more on the temper and the manner with which we may prevail upon ourselves to contemplate the subject than upon any other element. How can we make professions for ourselves and offer exhortations to Congress to right a manifestly unfair judgment filed against an element of society that has struggled earnestly for fifty years to become worthy of recognition?

During the half century of the transitionary period a valiant struggle was made by the veterinarians of America to build up their schools, their societies and their literature so that a struggling profession might demonstrate its worth. The self-love of an individual is not warmer in its sense nor more constant in its action than what is called in French "l'esprit de corps," the spirit of loyalty and comradeship among a body of people, that affection which a body of men is always found to bear toward its own prerogatives and power; what in our case we might term professional pride. The esprit de corps among that group of the profession who became members of the Bureau of Animal Industry was at a rather low state during the period subsequent to the signing of the Treaty of Peace at Versailles.

The profession had witnessed the ushering in of a new era in the affairs of the world, attended with a new vision of the relative proportion of men and material things. Financially we have undergone a revolution, commercially we have evolved with accelerated speed, industrially we have undergone such a change as could only be accomplished through the changing of views on the parts of employer and employee. As we look around and behold the new alignment of affairs, there does not seem to be anybody in their old places except the clerk and the annually employed scientific worker, teachers and ministers. They have stood steadfast, remained fixed,

[1] Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

and the world has exulted in having some individuals without initiative or power to demand the new order of things. You and I have seen the butcher, the baker and the candlestick maker move from obscurity to opulence. Your families and mine have witnessed the acquisition by our neighbors of the little luxuries that help to make the world pleasanter to endure during our sojourn. It has not been with envious eyes we have viewed these events, but in wonderment, puzzled for the time being why all should prosper save us. Then came the ray of hope that cheers and brings solace to those in despair. The Congress had at last become conscious of the plight of the civil employees of the Nation and had taken the initial step to correct the inequalities. Pessimism became quickly dissipated, and there reigned thrilling optimism, that brings happiness, contentment and peace.

The appointment by Congress of a Joint Commission on Reclassification of Salaries was an ideal plan of reconciling inequalities that have obtained in the Federal service from time immemorial. Congress took cognizance of the position of employees and sought to rectify the unbusinesslike principles; therefore, in the act approved March 1, 1919, it provided for the creation of a Joint Commission on Reclassification of Salaries to consist of three Senators and three members of the House of Representatives.

Paragraph 2 of the act provided that "It shall be the duty of the Commission to investigate the rates of compensation paid to civilian employees by the municipal government and the various executive departments and other governmental establishments in the District of Columbia, except the Navy Yard and the Postal service, and report by bill or otherwise as soon as practicable what reclassification and readjustment of compensation should be made so as to provide uniform and equitable pay for the same character of employment throughout the District of Columbia in the services enumerated."

In the above-mentioned act the Commission was instructed to report its recommendations as early as possible and in any event by the second Monday in January, 1920. On January 10, 1920, Congress passed a joint resolution extending the time for final report of the Joint Commission to a date not later than March 12, 1920. The report of the Joint Commission was transmitted to Congress March 12, 1920. It is a voluminous report covering 884 pages and is probably the most exhaustive volume ever compiled on the subject of the reclassification of a group of employees.

The United States Government is the largest employer in the world. It is "without a modern classification of positions to serve as a basis for just standardization of compensation and without a central employment agency having adequate power; in short, without an employment policy. This lack of a comprehensive and consistent employment policy and of a central agency fully in power to administer it, has produced most glaring inequalities and incongruities in salary schedules, payroll titles, and departmental organizations, with much resultant injustice, dissatisfaction, inefficiency and waste."

The Commission had under consideration the reclassification of approximately 107,000 employees. It divided the positions held by these employees into something more than 1,700 classes. The employees in a given class are those doing substantially the same kind of work, needing the same general qualifications and assuming about the same degree of responsibility.

The Commission, in commenting upon its work in a letter of submittal to Congress, states as follows:

"In separating the positions into appropriate classes our classifiers being only human have undoubtedly made some mistakes, but those mistakes can be rectified by the agency which takes over our records in coöperation with the heads of the various departments and bureaus."

As to the lack of uniformity and equity in the present rates of salaries the Commission found (1) that the salary and wage rates for positions involving like duties and responsibility showed wide variations and marked inequalities, (2) that the salary and wage rates for positions of the same class are different in different departments and independent establishments, the scale of pay in some departments being markedly higher than the scale for the same class of work in other departments.

In reclassifying the veterinarians in the Bureau of Animal Industry service it is quite evident that the Commission committed the same error to which attention is called in the two preceding paragraphs; that is, that the salary and wage rates for positions involving like duties and responsibilities and calling for the same qualifications show wide variations and marked inequalities. The veterinary service is classified by the Commission in three groups; first, veterinarian; second, veterinary bacteriologist; third, veterinary pathologist. The evil is not in a division of the group, but in the salary schedule for the three divisions.

Veterinarian

Junior veterinarian	$1,380 to $1,560
Assistant veterinarian	1,620 to 1,980
Associate veterinarian	2,100 to 2,820
Veterinarian	2,940 to 3,660

Senior veterinarian, compensation to be fixed by Congress.

Veterinary Bacteriologist

Junior veterinary bacteriologist	$1,800 to $2,160
Assistant veterinary bacteriologist	2,400 to 3,000
Associate veterinary bacteriologist	3,240 to 3,840
Veterinary bacteriologist	4,140 to 5,040

Senior veterinary bacteriologist, compensation to be fixed by Congress.

Veterinary Pathologist

Junior veterinary pathologist	$1,800 to $2,160
Assistant veterinary pathologist	2,400 to 3,000
Associate veterinary pathologist	3,240 to 3,840
Veterinary pathologist	4,140 to 5,040

Senior veterinary pathologist, compensation to be fixed by Congress.

The discrepancy in the salaries is not the only error that was committed, for if the report is adopted by Congress no veterinarian or veterinary bacteriologist can be promoted to the position of Chief of the Bureau of Animal Industry. The only provision made by the Commission for promotion to that position is through the channels of veterinary pathologist. A senior veterinary pathologist may be promoted to be Chief of the Bureau of Animal Industry, but a senior veterinarian or a senior veterinary bacteriologist for some unknown reason can not climb to the top of the ladder in the Bureau.

The channels that lead to the highest veterinary position in the Government service, however, are not confined solely to veterinary pathologists, as is indicated in the paragraph of qualifications for that position, which is as follows:

"Training equivalent to that represented by graduation with a degree from an institution of recognized standing with major work in biology and agriculture; graduation with a veterinary degree from an institution of recognized standing; 3 years' graduate work or experience regarded as its equivalent; broad knowledge of livestock and general agricultural problems; research experience with biological and economic animal problems and the application of scientific methods for the solution of such problems; not less than 5 years' administrative experience; and capacity to determine fruit-

ful lines of scientific research, to arrange work and direct staffs of investigators and of regulatory workers."

In all the annals of the adversities of the veterinary profession it has never encountered an obstacle that would tend toward demoralizing it as the classification given by the Congressional Commission. The aforementioned errors, grave as they are, are mild in comparison to the onerous isolation given to the veterinarian as compared to all other associated groups of scientific and technical workers. The scientific, technical, professional, subsidiary service contains the following groups:

Actuarial Service.
Agricultural Promotion and Extension Service.
Architectural Service.
Art Service.
Biological Science Service.
Chaplain Service.
Community and Recreation Service.
Economic and Political Science Service.
Educational Service.
Engineering Service.
Law and Examiners Service.
Library Service.
Medical Science Service.
Physical Science Service.
Social Science Service.
Statistical Service.
Translating Service.

There are a few groups in the scientific and technical service whose compensation is not larger than the veterinarian; for instance, the Chaplain Service provides a compensation at salary of $1,500 per annum, but it is presumed that the duties of the spiritual adviser are neither so arduous nor so constant, inasmuch as he may devote part of his time to the adminstration of his religious duties outside of the governmental institutions. There may be a few other isolated instances of smaller compensation, but they are not among the positions that are comparable in any way with the duties assigned to the veterinarian, such as the Biological Science Service, which is composed of the following classes: Agricultural explorer, agronomist, anthropologist, botanist, dairy manufacturing specialist, entomologist, fruit and vegetable technologist, horticulturist, animal husbandryman, dairy husbandryman, insect pathologist, animal

parasitologist, plant pathologist, zoologist, and many other groups.

Beginning with the agricultural explorer, which is the first group classified under the Biological Science Service, to the zoologist group, which is the last, the proposed salaries range from $1,800 for junior zoologist to $5,040 for full-grade zoologist. A careful examination of the entire report fails to reveal any group doing work of a scientific or technical nature that is not recommended for a uniform rate of salary of $1,800 to $5,040 except the veterinarian —not the veterinary bacteriologist or the veterinary pathologist, but the veterinarian. It is clearly evident, therefore, that the person or persons responsible for the classification of our group either did not possess a sufficient knowledge of the character of the work performed by the Bureau veterinarian, or, knowing the nature of the work, held it in low esteem. But the latter could not possibly be the case, because, when it became evident that the position was not being judged upon its merit, the Chief of the Bureau in an interview with one of the classifiers specifically called his attention to the equal importance of the veterinarian compared with the veterinary pathologist and veterinary bacteriologist, and in a statement to the Chief of the Bureau the classifier acknowledged that he had the wrong impression and definitely stated that all veterinary work belonged in one class. Now, after acknowledging that there should be no division between a veterinary bacteriologist, a veterinary pathologist and a veterinarian doing other lines of work in the Bureau service, discrimination was made against the latter, and for that reason we protest against the classification and propose to employ every means at our disposal to correct the injustice meted out.

Soon after the appointment by Congress of the Reclassification Commission, the employees of the Government in the District of Columbia engaged in scientific and technical work held a mass meeting for the purpose of discussing plans for aiding in furnishing the proper information to the Commission. It was debated at the mass meeting whether an organization should be effected to act independently of any other organization or to affiliate with the Federal Employees' Union. The latter proposition prevailed and the association was perfected. It held meetings from time to time and on several occasions had members of the Reclassification Commission deliver addresses. It was evident from the outset that the personnel of the Commission were giving much of their time and thought to the work in hand, and it was clearly apparent that they were seeking the very best information obtainable and were in sympathy with

rectifying the incongruous conditions that existed in the various Departments with respect to the inequality in the matter of compensation paid for the same class of work in the various departmental branches.

The Commission called for assistance for employees in the various lines of activities, and from each Department several representatives were detailed to work with the Commission for a period of several months; they were actually taken over by the Commission and worked in its offices. Of course, the strategical position for any group was to have a direct representative, but those employees were selected by the higher authorities and therefore there was no alternative but to accept those who were so assigned. The scientific and technical association did splendid work, as you may judge from the ultimate plan agreed upon. By degrees they approached the question of recommendations to be made to the Commission, and ultimately every group in the scientific association, composed of thirteen different branches, agreed upon the Macey scale, with which you are familiar.

The Commission announced that hearings would be held and an opportunity given to each group to present its case. The scientific group outlined a program for the presentation of their case covering all the various lines of work, and at the appointed time there appeared before the Commission some of the best authorities in the United States familiar with scientific lines of work, both inside of the governmental service and in the commercial world; and the manner in which they presented the subject to the Commission was worthy of great praise. They presented indisputable facts showing that the employees of the United States Government were underpaid and in consequence the turnover in the governmental service was productive of demoralization, and that unless some means were taken to attract and retain in the service competent employees, it would become a farce comedy.

During the days on which the hearings were held the Bureau veterinarians were represented by the most thoroughly conversant, the most able advocate, the most highly respected, and the peer of all veterinarians in America, the Chief of the Bureau of Animal Industry. Dr. Mohler submitted a brief showing the activities of the Bureau and the part played in them by the veterinarian. He made no distinction between the veterinarian, the veterinary pathologist and the veterinary bacteriologist. The statement was clear and conclusive and was accepted by the Commission without comment.

Just prior to the hearings the Commission sent out tentative plans for dividing the veterinary service. It had that group classified under three headings: veterinarians, veterinary bacteriologists, and veterinary pathologists. When Dr. Mohler saw that arrangement he recommended that it should not be adopted, but that all three should be grouped as one class. This is rather an important step in the reclassification workings. It indicated that someone outside of the Bureau service was separating the veterinary personnel, and immediately the Chief of the Bureau, who should be in a position to know more about it than anybody else, protested against such a classification.

Several weeks after the termination of the hearings two representatives of the staff of the Commission called on the Chief of the Bureau, and during their conversation the question was asked by them, How do the duties of the veterinarian compare with the duties of the veterinary bacteriologist and the veterinary pathologist? They asked the direct question, Do not the veterinarians confine their work strictly to inspecting meats? And just as emphatically they were answered: "The veterinary group should not be divided. The veterinarians do not confine their work to the inspection of meats. They are engaged in meat-inspection work; they are engaged in the administration of the meat-inspection act of 1906; in the control and eradication of Texas fever; in the eradication of cattle scab, sheep scab and dourine; in the control of hog cholera; in the eradication of tuberculosis; in supervising the importation and exportation of animals and hides; in the suppression of outbreaks of infectious diseases, and in many other activities."

Now, in reply to the clear statement of the activities of the veterinarians, the representatives of the Commission stated they understood now that the duties of the veterinarians are such as to justify placing them in the same group as bacteriologist and pathologist, and Dr. Mohler replied that that was where they should be placed.

At this juncture I want to state that the authority of the Commission was very broad. They had the right to conduct investigations outside of the District of Columbia, to gather data relative to similar groups of employees in States, counties and municipalities or in private employ; and a vast amount of material of this character was obtained. There is no doubt the Commission obtained from the various States, counties and cities information as to the salaries paid veterinarians in those respective services; and from our knowledge of this phase, the data would not be so illuminating as to make the

salaries paid by the Bureau look meager. Our Association gathered these data over a year ago for the purpose of using them in submitting a brief to the Commission, but they were unsatisfactory and showed clearly that these branches of State and municipal governments were as clearly far behind present-day conditions as the Government with respect to paying employees. Therefore we did not use that information.

This brings us down to the time when the report was submitted, March 12, 1920; and as we have reviewed that rather at length, we will proceed on another phase of the subject.

A few days after we received the news, a meeting of the local branch of Bureau of Animal Industry Veterinarians was called and the following resolution was adopted and sent to the Chief of the Bureau:

"*Whereas*, The Congressional Reclassification Commission in its report to Congress on March 12, 1920, places veterinarians in a class lower than that of other employees engaged in scientific and technical work;

"*And whereas*, The qualifications required of veterinarians in the service of the United States Department of Agriculture are scientific and technical and are so defined by the Department, and were so represented to the Reclassification Commission;

"*And whereas*, The services rendered by veterinarians are highly important not only in the administration of scientific and technical projects, but also because of the great economic value of such service to the Nation in general and to the livestock industry in particular;

"*And whereas*, The salaries accorded veterinarians by the Reclassification Commission are wholly incommensurate with their qualifications or the importance of their duties or the responsibilities discharged by them;

"*Be it resolved*, That we, the veterinarians in the Department of Agriculture, declare the Commission's classification of veterinarians to be clearly erroneous and wholly inadequate, and that we protest its adoption, basing such protest upon the ground that adoption would work injury and injustice to the veterinarians, and materially impair the service which the Department of Agriculture is rendering the Nation in general and the great livestock industry of our country in particular;

"*And be it resolved*, That we earnestly and respectfully appeal to the Secretary of Agriculture and to the Chief of the Bureau of Animal Industry that such official action as may be proper in the premises be instituted by the Department or the Bureau for securing to the veterinarians in the Department an adequate and just classification;

"*And be it resolved,* That we gladly accept the assistance of the Federal Employees' Union in placing before the proper committees any data that may be necessary to present proof of error in judgment by those responsible for salary classification of veterinarians;

"*And be it resolved,* That copies of this resolution be forwarded to the Secretary of the Department and to the Chief of the Bureau for their consideration, as well as to the President of the Federal Employees' Union."

On April 14 Secretary Meredith addressed a letter to Hon. Andrieus A. Jones, Chairman of the Joint Commission on Reclassification of Salaries, United States Senate, in which he clearly set forth that the veterinarians were improperly classified, and in concluding he stated:

"It is my understanding that a supplementary report is to be issued by the Reclassification Commission, and it is hoped that you will appreciate the importance of correcting the error that was made by the Commission in classifying veterinarians and lay inspectors."

Senator Jones, in reply, stated in part:

"The Commission realizes that this report is not perfect and that doubtless a number of changes will be necessary. The report, however, has been referred in the Senate to the Committee on Appropriations, and changes can only be made through that Committee. When the Committee takes up the report for action I am sure that it will give to your suggestions full consideration. I shall be glad to refer your letter to that Committee. As I understand it the Commission no longer has jurisdiction."

The Secretary of the District Branch of the National Association of Bureau of Animal Industry Veterinarians, Dr. F. W. Meyst, on April 14 addressed a communication to Secretary Meredith accompanied by the resolution above referred to. The Secretary, in acknowledging receipt of the letter and resolution, stated:

"I * * * desire to assure you that I am in sympathy with the attitude of your Association in regard to the apparent discrimination against a part of the veterinary service in the report made by the Congressional Joint Commission on Reclassification of Salaries. The matter has been called to the attention of Hon. Frederick R. Lehlbach, Chairman of the Committee on Reform in the Civil Service; Hon. Francis E. Warren, Chairman of the Committee on Appropriations, and Hon. Andrieus A. Jones, Chairman of the Congressional Joint Commission on Reclassification of Salaries, and others, and energetic efforts are being made to have the error corrected."

Congressman Lehlbach, Chairman of the Committee on Reform in the Civil Service, in acknowledging receipt of Secretary Meredith's letter, said:

"I am very glad to receive the information contained therein; also your views on the classification of veterinarians. There will be hearings on the report and I will later advise Dr. Mohler of the date in order that he may present his views before the Committee."

I think you will agree that the administration force at Washington have taken every measure available to rectify the error. The Chairman of the Commission states that no change can be made in the report until it has been considered by the Congressional committee to which the bill was referred.

On March 23, 1920, your Committee on Legislation and Publicity addressed a letter to the members of the Association containing the facts with respect to the classification of veterinarians by the Commission. In the last paragraph you were urged that—

"The important thing to do now is to organize in such a manner that if a hearing can be arranged for, you will be prepared to have representatives come to Washington to appear before the Committee or that they will send proper forms of petitions and resolutions. The next thing, especially for those living in States where there is a member of the Committee on Reform in the Civil Service, is to get the leading veterinarians and leading livestock owners and others interested in trying to arrange for a hearing."

The following day, March 24, a follow-up letter was sent to the same persons, in which it was stated:

"We have been very busy here in Washington since the report was submitted, in trying to have the error corrected. A committee visited the Commission's office and was informed that the classification of veterinarians is an error and in their judgment it can be corrected. Dr. Mohler has taken the matter up with the Secretary and also taken the matter up with the chairman of the Reclassification Commission and has asked for an early hearing on the subject.

"In view of what has transpired in the past few days, it is recommended that no definite action be taken by any local branch of the National Association until you receive notice to do so. In the meantime, I recommend that you hold a meeting and get your machinery in order so as to take immediate action if notified to do so.

"If this is not plainly outlined I suggest that you hold the matter in abeyance and write me and I will try and explain more in detail our views on the subject. It is possible that this matter can be corrected without going to a great deal of trouble and expense, and, of course, that is the desirable thing to do."

After careful inquiry was made of what action could be taken, it was clearly apparent that nothing could be done until the report was taken under consideration by the committee in Congress to which

it was referred. Your committee endeavored to explain this to the members and recommended not to undertake any campaign until it appeared the proper time, for it was believed then and confirmed by subsequent events that much of the effort put forth to have the wrong righted would be lost.

The observation made by the Bard of Avon is very applicable to our particular condition: There comes a time in the affairs of man which taken at the flood leads on to victory. From March 12 the tide has been on the ebb. When the water slackens in that direction and it begins to flow in the opposite way, then will be the time for us to take action. I am very glad to observe that all of our local associations worked in harmony on this plan and did not go any further than to prepare to call attention of Congress to the error in the report. Some excellent work was done and will be productive of results at the right time.

As most hearings before Congressional committees are limited in time, it is probable that when this matter is taken under consideration we will probably have not more than one day, or part of a day. Within that time it would behoove us to have appear before the Committee the most representative spokesman of the livestock industry of the United States that we could interest in the subject. It appeared to us that it would be of little assistance to notify a large number of veterinarians of the Bureau to appear before the Committee. We believe that we could not select any veterinarian who through knowledge of the subject and through personal interest in the matter would be as well qualified to represent our group as the Chief of the Bureau. This statement is made in all sincerity and in deep appreciation of the valuable services rendered the Bureau veterinarians by those outside of that organization on many occasions.

The American Veterinary Medical Association should be represented before the Committee, because through the Legislative Committee of that organization wonderful results were obtained in favor of the veterinarians in the Army and in other lines of work. I do not think it is necessary for the Legislative Committee of the American Veterinary Medical Association to be specially instructed at this meeting to take care of this matter, because we know they are interested in our work and will eagerly respond at any time they can be of assistance. The United States Live Stock Sanitary Association should have representatives appear before the Committee, and spokesmen representing the following named livestock associa-

tions should also appear before the Committee: American National Live Stock Association, Texas Cattle Raisers' Association, American Wool Growers' Association, Southern Cattlemen's Association, Swine Growers' Association. A committee representing the American Agricultural Editors' Association should be present at the hearings and take part. There should be a representative of each of the following named purebred cattle breeding associations in attendance who may be called upon at the proper time: American Aberdeen-Angus Breeders' Association, Ayrshire Breeders' Association, Brown Swiss Cattle Breeders' Association, American Devon Cattle Club, Dutch Belted Cattle Association of America, American Galloway Breeders' Association, American Guernsey Cattle Club, American Hereford Cattle Breeders' Association, Holstein-Friesian Association of America, American Jersey Cattle Club, American Kerry and Dexter Cattle Club, Polled Durham Breeders' Association, Red Polled Cattle Club of America, American Polled Hereford Breeders' Association, American Shorthorn Breeders' Association, Milking Shorthorn Cattle Club of America.

In addition to the above mentioned, if we could augment the assembly by individuals of national reputation who are conversant with the livestock industry and the service rendered by veterinarians, they should also be enlisted to attend. A representative of the veterinary colleges could play a very important part at the hearing in explaining the educational side of preparing and training men for the profession.

Your committee proposes to delegate to certain local branches the work of selecting representatives from the various lines of activities to appear before the Congressional committee. It will be necessary to outline the program for the guidance of the representatives, and it is believed that each local branch is well enough conversant with the subject to prepare a brief on the subject for their guidance. It is probable that notice of the date of the hearing will be given in sufficient time in advance so that ample preparation may be made.

Congress does not assemble until the first Monday in December, and it is probable that no action will be taken with respect to the Congressional report until after the Christmas holidays. Therefore, while we do not propose to be tardy in taking up this work, we recommend that the virtue of patience be practiced as far as possible.

PIONEER WORK IN TUBERCULOSIS CONTROL[1]

By LOUIS A. KLEIN

Dean of the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

IT is my privilege and pleasure to welcome you to the University and to say to you that we shall be very glad to place at your disposal any facilities we may have which will be of service to you. It is very appropriate that this, the first conference of its kind held in this section, should meet here, for it was here and in this neighborhood that the first important steps were taken which in the course of time led up to the inception of the work in which you are now engaged. The first tuberculin test made on this continent was applied in 1892 near Villa Nova, twenty miles west of Philadelphia, to a herd of purebred Jersey cattle. The cattle were owned by the late Mr. J. E. Gillingham, one of the Trustees of the University, and the test was made by the late Dr. Leonard Pearson, at that time Professor of the Theory and Practice of Veterinary Medicine in this school. There were 79 cattle in the herd, some of them imported and all purebred, and 51 reacted to the test. On March 16, 1892, 6 of them were brought to the Veterinary School and killed for postmortem examination.

Dr. Pearson was a student in Germany in 1890 when Koch discovered tuberculin, and he became deeply interested in the substance when Professor Gutmann, of the Veterinary Institute at Dorpat, Russia, used it for the first time as an agent for diagnosing tuberculosis in cattle in January, 1891.

Early in 1892 Pearson was called on to examine a cow in the Gillingham herd, and on making a physical examination found symptoms indicating tuberculosis and recommended the destruction of the animal. The cow was killed the next day and the postmortem examination confirmed the diagnosis. The entire herd was then subjected to a physical examination, and five more case were found and destroyed. Some time later a cow that would not breed was sent to the butcher and was found to be tuberculous. It was then decided to apply the tuberculin test to the herd, and approximately two-thirds of the animals reacted. The reactors were valued at $10,000.

[1] Presented at the Tuberculosis Eradication Conference, Philadelphia, Pa., October 11-13, 1920.

Pearson was a young man at that time, only 25 years old, and had but recently returned from Europe, where he had spent a year in post-graduate study after completing the course in this school. He had been engaged in practice and in teaching only a few months. Very naturally the results of this new and practically unknown test applied by an apparently inexperienced young man were questioned by many veterinarians and physicians, some of whom held Federal, State and city positions. One physician went to the trouble to interview Mr. Gillingham and tried to induce him not to have the cattle destroyed. But Mr. Gillingham did not question the diagnosis, and as he did not wish to keep or to sell the tuberculous cattle, he decided to have them destroyed.

As before stated, six of the reactors were killed here at the Veterinary School and examined postmortem on March 16, 1892, nearly 29 years ago. Many veterinarians, physicians, scientists and livestock owners were present to see if the postmortem findings would confirm the results of the test. There were not a few skeptics among them, and one can readily imagine what these doubting Thomases said when the first cow that was killed failed to show any very definite lesions of tuberculosis. But the five other cows destroyed on the same day were plainly tuberculous, and microscopic examination of the lesions from the first cow disclosed the presence of tubercle bacilli. The other reactors were destroyed and buried on the farm near Villa Nova.

You will find no report of this test and the postmortem demonstrations in the veterinary journals of that day. The only record to be found is in the Philadelphia *Public Ledger*, of March 17, 1892. It was a peculiarity of Dr. Pearson that he rarely took time to write up his work.

During the following three years Pearson used the tuberculin test in his private practice. Some veterinarians and livestock owners were slow to take it up, and several State and Federal officials and some livestock journals even vigorously opposed it. Its efficiency and reliability were recognized by veterinarians, physicians, sanitary officials and the more progressive livestock owners when they became more familiar with it. But the opposition of some of the livestock owners and journals continued for a long time. They claimed that tuberculin would transmit tuberculosis to a healthy animal, that it would produce abortion and sterility, and that animals would react to it which were not tuberculous.

In 1895, when the Pennsylvania State Livestock Sanitary Board was organized and Pearson became its Secretary and the State Veterinarian, he introduced another method in connection with the control and eradication of tuberculosis which has had far-reaching results. This is the principle of testing herds on the voluntary application of the owner. A law authorizing compulsory tuberculin testing was passed in Massachusetts a few years before, but when it was put into operation the livestock owners raised such vigorous objections that the next Legislature repealed it. The principle of testing only on voluntary application was the keystone of what became known as the Pennsylvania plan for controlling tuberculosis, and it is also one of the features of the accredited herd plan.

Time will not permit me to speak further of the work of this great pioneer in the control and eradication of tuberculosis in cattle, but what I have said will be sufficient to bring to your attention some of the difficulties that had to be dealt with in the early days of this work. You, of course, are not without your problems and difficulties, but you are in a much better position than those who first traveled this way, for they have broken the road for you and smoothed the path in many places.

The eight States represented at this meeting contain more than 10 per cent of all the cattle in the country and over 12 per cent of the milk cows. There are in these States over 7,000,000 cattle of an estimated value of nearly $4,000,000,000. If we add to this sum the value of the lands and the buildings and equipment necessary to care for them and their products we will have a total of probably $8,000,000,000. Viewed from a purely economic standpoint, and leaving aside the question of public health, the control and eradication of tuberculosis in cattle is a matter of great importance not only to the cattle owner, but also to all consumers of meat and milk. The subject which you have gathered here to consider is therefore worthy of careful and serious attention, and we here at the University feel that we shall be rendering a public service by assisting you in any way that we can. I wish you a successful and profitable meeting and hope you will come again.

HOW THE COOPERATIVE TUBERCULOSIS ERADICATION CAMPAIGN AFFECTS AND APPEARS TO THE PRACTITIONER[1]

By J. F. DEVINE, *Goshen, N. Y.*

HOW the coöperative plan of tuberculosis eradication affects and appears to the practitioner I presume will depend largely upon the veterinarian as an individual and the locality in which he practices. Every veterinarian has a right to his opinion on the matter, and I assume, therefore, that I have a right to mine, and I shall take advantage of the privilege given me by your program committee to express my views. All my life I have suffered the failing of two peculiarities. One is that I never volunteer advice to anyone except my children. The other is that if I am asked for my opinion I give my opinion and not one that has been dressed up for the occasion to satisfy someone's vanity. My opinion of the coöperative tuberculosis eradication campaign is that it is the embodiment of more things in the way of bovine tuberculosis eradication than all other things that have been attempted or carried out since Koch first isolated the organism and tuberculin was discovered as a diagnostic agent. I would further add that any veterinary practitioner who does not look upon this work with the same attitude is either lacking in broadness of vision or is selfish enough to put personal gain in advance of a great public good.

Having been a veterinary practitioner most of my life, and having had to depend upon veterinary practice for shelter, raiment and the necessities and comforts of my family and the support of my business ventures, I am in a position, I think, to know something of the hardships and vicissitudes of a general practice; and I question if there were many men in the United States who did more tuberculin testing during the first decade of this century than I did. Nevertheless I have counseled all of my clients who have purebred herds or who have grade herds, that I think are reasonably free from tuberculosis, so that the client would not suffer too great a loss, to put all their herds under State and Federal supervision; therefore I know what the loss of revenue from this work means to a country practitioner. I am also in a position to know the damnable persecution a man in general practice must suffer for honest tuberculin testing; and I say to all veterinarians, young and

[1] Presented at the Tuberculosis Eradication Conference, Philadelphia, Pa., October 11-13, 1920.

old—and I say it after twenty-five years' experience—that a veterinarian who cannot make a better living in his community without ever tuberculin testing a cow, with the possible exception of one now and then as a favor for a few clients, is either in the wrong community and had better move out, or is incapable or too lazy to give real service. I realize that this statement may not be fair in some cases, that somewhere there may be a veterinarian who finds the practice in his locality has changed or that he is tied down to a community by age or property holdings, and that tuberculin testing just fills out a living; but it is more than likely that the State would be glad to avail itself of such a man's service, if he can devote much time to tuberculin testing; and at any rate we must not neglect millions of people and a great industry to favor a few. A real practitioner can soon make his services so valuable at other work in his community that he is well rid of tuberculin testing, and the present method of Federal and State coöperation has taken it out of the realm of barter and abuse and put it on a plane of thorough, impartial, scientific eradication.

There is no phase of veterinary practice where honesty, accuracy and skill have been received so thanklessly as tuberculin testing in many instances. Up to the last few years, until breeders awoke to the disasters of bovine tuberculosis and the losses that follow in its wake, many cattle dealers and some breeders would employ a veterinarian to make a tuberculin test and then "cuss" him for finding the diseased ones. The veterinarian was ever facing the limitations of tuberculin on one hand and the hostility of its accuracy on the other.

Tuberculin testing always has interfered with a busy practitioner's other work, and the other work of busy practitioners has too often interfered with satisfactory tuberculin testing. The eradication of tuberculosis requires systemized, concentrated tuberculin testing by men who can make a special study of it and devote their time to it. Up to the present time we have simply been getting information to prepare us for the work. With men specially trained and devoting all their time to it, and using the combination tests which we are learning more about daily, we are placed in a position to do such accurate work as to demand the support and reliance of the public. The more we specialize and the more accurate we become, the more we may expect the public's support.

I realize the shortcomings of Federal and State inexperienced men and the advantages in some cases of the intimate knowledge of a herd

the local man may have, but the latter is simply a matter of coöperative detail that is now being worked out by the authorities taking into counsel the local man. As to the former, it is the duty of every veterinarian and stock owner to appeal to Congress for sufficient funds that the veterinarians employed for this work may receive a salary such as professional men doing such important work should receive. In this way we insure high-class service to the stock owners and the public and make it possible for those in authority to eliminate from their forces unreliable or undesirable men.

I do, however, strongly object to Federal or State authorities persecuting local practitioners by allowing certain practitioners who are on the State force, and so coöperating with Federal and State men, to test herds the owners of which are regular clients of other veterinarians in the same community. Some of these practitioners are unscrupulous enough to proselyte the other veterinarian's clients. We have this condition going on in our own State, and it is a serious injustice to our honest practitioners. No practicing veterinarian, so long as he is in practice, I care not if he is on the State list, should be allowed to take any part either in testing or autopsy of the stock of another practicing veterinarian's clients in that locality. If the local practitioner is not to assist in the work in his own client's herds, then a man from a considerable distance or a man who gives his whole time to the State or Government should do the work. This is an important matter that perhaps the official who has never practiced may think lightly of, but it is by far the most serious and objectionable thing that is occurring to the general practitioner under the present method.

As a stock owner I am just as strong for the work. Things are not perhaps as smooth as they should be, but large bodies move slowly. The conflicting State rulings should be eliminated, and eliminated at once, and I predict that they will be as rapidly as possible.

Breeders and veterinarians should rejoice that the administrative work of this great problem is not in the hands of crooks or politicians, but in the hands of such capable, honest men as John R. Mohler and J. A. Kiernan in the Federal Department, and I believe equally reliable men in the State Departments.

CLINICAL AND CASE REPORTS

GASTRO-HYSTEROTOMY IN A HEIFER

By LOUIS LEVINSON, *Middletown, Delaware*

ON June 21 about 5 a. m. I received a rush call to make a 30-mile trip to deliver a calf. Arriving at my destination, I found a 17-months-old purebred Holstein heifer vainly attempting to give birth to her calf. Upon inquiry I was told that the heifer had been in labor for 12 hours and that continuous efforts had been made to remove the calf. The heifer was in good condition and her expulsive efforts were strong. Examination was extremely difficult, due to previous exploration and narrowness of the pelvis. The presentation was anterior and the head was deviated to the left.

After two hours' hard work on an empty stomach, without making any headway, I decided to do a gastro-hysterotomy, or, as I told the owner, a Cæsarean section.

The right flank, the site of the operation, was thoroughly washed, clipped, shaved, and painted with tincture of iodine. A white bed sheet was asked for, and it was dipped in a warm 3 per cent therapogen solution and the entire right side of the animal was covered. The sheet was carefully cut so as just to expose the operative site. Restraint consisted of a half hitch around both hind legs, in which condition they were drawn backward and fastened to an upright support.

An incision was made 10 inches long in the right flank, midway between the ileum and the last rib, about 6 inches below the external angle of the ileum. The incision was carried through the external and internal abdominal muscles. The peritoneum was incised with a blunt-pointed bistoury to protect the abdominal viscera. Some trouble was encountered by the prolapsing of the small intestine through the incision.

After thoroughly cleansing the hands and arms again, an exploration of the abdomen was made. It was a strenuous task to bring the gravid uterus into view so that a favorable site for an incision could be found. It seemed best to make the incision on the greater curvature because there were no large blood vessels to contend with. The incision in the uterus was about 12 inches long. Care was taken to prevent any of the infected intra-uterine liquid

from entering the abdominal cavity. Both hind legs of the fetus were secured by clean cotton ropes and placed in the hands of an assistant. A vaginal examination was made and the fetus pushed back into the abdominal cavity. The fetus was then easily removed from the uterus. The placenta was removed at the same time.

The incision was cleaned and the edges carefully approximated by a continuous Czerney catgut suture which was followed by a continuous Lembert suture. The sutured incision and adjacent area were thoroughly painted with tincture of iodine. All prolapsed intestine was carefully swabbed with a mild therapogen solution and replaced. The peritoneum and the internal and external abdominal muscles were separately sutured with a continuous catgut suture, the skin with interrupted silk sutures. About 1½ inches of the external abdominal muscle and of the skin were left open at the bottom for drainage. Food was withheld for 24 hours.

The heifer got up the same afternoon, but showed symptoms of weakness by getting up only for an hour or so at a time.

The following tonic and milk stimulant was prescribed:

	Troy ounces
Antim. sulphid	1½
Sulphur sublim	1½
Gentian pulvis	3
Sal. Carol. fact., q. s	10

Misce et fiat chart. No. 15.

Signa: One powder b. i. d. on feed.

As the case was about 30 miles from my office, it was not possible for me to see it inside of a week, so I thought it best to advise that the wound be left alone and not syringed. Another call was made a week after the operation, and the incision was making splendid headway in healing. The animal was eating well and increasing in milk. No flinching was noticeable upon palpation or exploration. There was a little discharge, and an antiseptic wash was advised. One month after the operation the wound was completely healed and the heifer had gained remarkably in weight and was giving 16 quarts of milk daily.

Although I was careful regarding antiseptics, I realize that the operation was far from being aseptic. I further believe that a cow will stand a gastro-hysterotomy better than hours of intra-uterine manipulation.

TWO DOG CASES

ON the evening of May 14 last, an aged spaniel bitch was brought to hospital with a large dropsical abdomen and prolapse of the vagina about four inches long, which had evidently been rubbing on the floor for some days, as it was rough, bluish in color, and had a fleshy growth and a very offensive smell. The owner said the bitch was not pregnant, and I could not satisfy myself by manipulation that she was. After antiseptizing the vagina, it was easily returned and the passage appeared to be normal. On the morning of May 15 it was out again, but easily returned; and as it came out several times during the day, I obtained a spring pessary and inserted it after being softened in hot water to keep it *in situ*.

On the morning of the 16th the pessary had been forced out, and three pups born alive; a large quantity of fluid was discharged. The vaginal passage remained out in its inverted condition; it was kept aseptic, and on the 17th two more pups were born, and on the 18th one more, these three being dead.

On the 20th there was a distinct line of demarcation between the fleshy part of the vaginal protrusion and the vaginal passage, and after injecting with cocaine, I applied a catgut ligature which almost cut off the enlargement, which was very soft, and in a couple of hours dropped off, and vagina retracted at once. The bitch was discharged cured, with three live puppies on May 28.

On May 14, a client advised me that three days previously a fox-terrier puppy of his had extruded a tape worm from the anus, where it remained; that he had been unable to pass feces since, and was in pain.

I told him to bring the dog to the surgery. Upon examination I found a projection from the anus of what appeared to be cotton, clogged with dried feces. After softening with a sponge of warm water, and clipping off some hair that was fast in the substances, I was enabled to seize it with a pair of forceps when it easily came away. It turned out to be a needle and thread, the point of the needle projecting outwards from the anus and surrounded by the thread rolled around it, which was traced up to the eye of the needle where it was threaded. The dog passed feces immediately and was not seen again.

ARTHUR NEW, M. R. C. V. S.,

The Veterinary Record, Nov. 20, 1920.

TO ANESTHETIZE BIRDS

IF you have never had occasion to anesthetize a chicken, turkey or duck with chloroform or ether, you still "have something coming." If you have tried it, you probably know the chicken's spirit in most cases went soaring away, not on the chicken's wings either. Most birds will die under general chloroform or ether anesthesia because the vapor gets in the airs sacs and stays there until absorbed. As the area of the air sacs is enormous, a corresponding amount of anesthetic is taken in them. We recall an instance when a helper took some young chickens home to cook, that we had been experimenting upon, and later reported that they were "no good; could taste the ether."

Doctors Pearl and Surface, of the Maine Experiment Station, who have done a large amount of experimental research work on birds, give in the *Journal of the American Medical Association* their method of anesthetizing birds that has proven very satisfactory:

"The exact method of procedure which we now follow in anesthetizing birds is as follows: Immediately before beginning the administration of the anesthetic a 1/200-grain atropin sulphate tablet is dissolved in 1 c.c. of warm normal saline solution. The salt solution with the dissolved atropin is then injected subcutaneously in the axilla. Ether is used as the anesthetic. It is administered from a small improvised mask which admits of the condition of the comb being seen during the operation. Depending on how hard the ether is pushed, the bird is ready for operation in from fifteen to twenty minutes after the anesthesia is begun. The dosage of 1/200-grain atropin to a bird may seem large, but we have never been able to see the slightest bad effect from it, provided the administration of ether was begun immediately after the injection of the atropin." N. S. MAYO.

Dr. Robert W. McCully, Dr. Cassius Way, and Dr. Howard E. Winter were the official veterinarians for the National Horse Show Association which recently held its exhibition at Madison Square Garden, New York City.

"A premium of 10 cents a hundred pounds on milk from cattle that are free from tuberculosis will be paid to dairymen in McKean County, Pa."—*The Farm Journal.*

Ice cream made of goats' milk and flavored with rose leaves is the delicacy par excellence of Greece and Crete, according to an American Red Cross worker recently returned from abroad.—*Milk Reporter.*

ABSTRACTS

THE RELATION BETWEEN THE QUANTITY OF SERUM ADMINISTERED AND THE ACTIVE IMMUNITY PRODUCED IN THE SIMULTANEOUS VACCINATION AGAINST HOG CHOLERA WITH VIRUS AND SERUM. Thomas P. Haslam. Journal of Pathology and Bacteriology, Vol. 23 (1920), No. 3, page 333.

The author states that authorities upon this subject differ as to whether too great a quantity of serum administered in the serum-simultaneous vaccination against hog cholera inhibits the ability of the virus to produce active immunity. The great practical importance of this question is indicated because both experiments and experience have shown that if simultaneously vaccinated pigs receive a sufficiently large dose of serum with virus, they do not disseminate hog cholera. Hence if a large dose of serum does not interfere with the immunizing properties of the virus, the simultaneous vaccination may be applied without fear of creating new centers of infection.

As a result of his experiments he concludes that—

1. The largest amount of virus administered did not prevent 2 c.c. of defibrinated blood virus from producing active immunity, as evidenced by the resistance to virus six months after vaccination.

2. Filtered virus failed to produce active immunity in the serum-simultaneous method.

3. There seems to be no fundamental drawback to the serum-simultaneous method of immunization against hog cholera, since large doses of serum do not interfere with active immunization.

GERM-FREE FILTRATES AS ANTIGENS IN THE COMPLEMENT-FIXATION TEST. W. S. Gochenour. Journal of Agricultural Research, Vol. 19 (1920), No. 10, p. 513.

From the data at hand the author concludes that—

1. A blackleg filtrate produced under favorable conditions will possess a distinct antigenic value demonstrable by the complement-fixation test.

2. Those blackleg filtrates that conferred a solid immunity on calves were found to possess a high antigenic titre.

3. The complement-fixation reaction should be of much value as a laboratory control test to determine whether the filtrate has been produced under conditions favorable to the blackleg organism or whether the blackleg organism has been supplanted in part or wholly by contaminating anaerobic microörganisms.

4. Botulinus filtrate also acts as an antigen in the complement-fixation test when type B serum is used with type B filtrate, but fails to cause fixation when one type of serum is used with the other type of filtrate as antigen.

5. The phenomenon of germ-free filtrates acting as antigens in the complement-fixation test is new and promises to play an important part in the differentiation of the spore-bearing anaerobes, more especially those having closely similar cultural characteristics.

DIRECTORY OF A. V. M. A. MEMBERS

Secretary Mayo has copies of the directory of considerably over 4,000 A. V. M. A. members for sale to non-members of the Association. The price per copy as fixed by the Executive Board, is $2.50. All inquiries and orders should be addressed to N. S. Mayo, Secretary, 4753 Ravenswood Avenue, Chicago, Ill.

PROGRESS IN TICK ERADICATION

THE release of 32,171 square miles of quarantined area in the cattle-tick infested States of the South is made in a revised quarantine order signed by Secretary of Agriculture Meredith, which became effective December 1, 1920. Failure of county officials to coöperate in eradicating the tick in their areas caused the requarantining of 7,917 square miles. Under the revised quarantine approximately 218,000 square miles are held to be infested. The total net area released since the beginning of systematic tick eradication in 1906 now amounts to 510,000 square miles, or 70 per cent of the originally infected territory. The work against the cattle tick generally is progressing very successfully, though the failure in "mopping up" certain sections is responsible for many districts still being held under quarantine which would otherwise be released. It is expected, however, that during the coming year such coöperation will be obtained and that a much more substantial area will be freed from quarantine.

The many friends of Dr. John H. Blattenberg will be pleased to learn of his recent marriage to Miss Helen May Painter, of Mansfield, Ohio. He appeared in Chicago at the meeting of the United States Livestock Sanitary Association with his charming young wife, but it was necessary for the Major to produce his credentials before his colleagues would believe that he had left the ranks of the benedicts. The JOURNAL extends its congratulations and best wishes.

ARMY VETERINARY SERVICE

MORE ABOUT CIRCULAR LETTER 47

To the Editor:

The October issue of the JOURNAL contains an analysis and criticism of "War Department Circular No. 47," of April 1, 1920, signed "M. C. H." (This should be "Surgeon General's Office, Circular Letter No. 47.")

It seems to me the writer takes too pessimistic a tone, and that his criticism is entirely destructive and in several of his points based on incorrect premises. He states: "The subordination and dependence of the Veterinary Corps to the Medical Corps is to be emphasized." Keeping in mind the continued efforts of the past to have it placed under the control of the Quartermaster Department, and the fact that in the A. E. F. a veterinary officer was actually displaced and a quartermaster officer put in his place, it is a big question whether it is not for the best interests of the Corps to be a subordinate and dependent part of the Medical Corps. I believe we are all agreed that the Veterinary Corps should be entirely distinct from the Remount Service, and under no direct control of the Quartermaster Corps, and I further believe the best informed, and the conservative, veterinarians both in the Army and in civil life consider that it is not yet ready to stand alone as a separate corps.

M. C. H. states that a change in Special Regulations No. 70 is contemplated, by which the veterinarian of a post or command will be required to report through the surgeon. A careful study of Circular Letter No. 47 does not seem to the writer to warrant this conclusion, though S. R. 70 certainly will be changed many times, as it has already been to some slight extent. While it is not to be desired that this change should be effected, it would not be such a calamity as M. C. H. infers. As far as reporting to the War Department is concerned it makes little difference, beyond slight delay, if the correspondence has to go through the surgeon's office; it will be handled by the veterinary division of the Surgeon General's Office just the same. And in the much more important relations with the commanding officer of the post or command there are some advantages in having the surgeon take up important matters with the C. O. In a division the surgeon has the ear of the C. G. and the

Chief of Staff at all times, and has great influence, and even authority, in all matters pertaining to the health and efficiency of the command—far more than a veterinary officer, whether he be second lieutenant or major, can ever have. All veterinarians who served as such with tactical units can recall numerous cases of inability to get results because it was impossible to present the case to the highest authority. The Division Surgeon, however, can usually get things done where the veterinarian cannot even get a hearing.

M. C. H. complains of the proposed use of the enlisted men of the Corps. If any success at all has been gained in the effort to improve the Veterinary Corps, it lies in the addition of an enlisted personnel. And if provided at all these men should certainly be made the most of. It is no concern of the Army if any of these men take to practice after leaving the Army. It is up to veterinary associations and the civil authorities to enforce the laws on the subject of quackery. The Army is interested only in the animals of the Army, and to object to assigning a farrier to "a station of such limited animal strength as not to warrant the assignment of a veterinary officer," even if he is to work under the direction of the surgeon, seems absurd. And it is incorrect to say this will be a return to old conditions. In the old days, before 1917, there was nothing to compare with this, and sick and disabled animals were treated by the stable sergeants or company officers, or I. C.-ed and discarded with little or no attempt at salvage. Take, for an example, a company or battalion of infantry on border patrol, with an animal strength of a dozen to a hundred draft mules. It would be impracticable to have a veterinary officer assigned, but a very important thing to have a farrier or veterinary sergeant. And it is certainly better to have him under the authority of the M. O. than of the line officers, or, as might easily result, under the stable sergeant of the supply company. As was illustrated time and again in the war, an enlisted man without an official home is in an unenviable position. He must have a commanding officer to get him rationed, clothed and paid, and the Hospital Corps detachment is the logical unit to attach him to.

The objection that "the enlisted man will combine the functions of an enlisted man with those of a veterinary officer" is no objection at all, but is a concrete statement of his purpose and duties. In France, both in action and "in rest," the horse strength was very much scattered and it was impossible for the V. O. to see all his

animals every day. An enlisted man was assigned to each infantry unit having a detachment of the supply company, or to each battery, whenever this was possible, and proved invaluable in preventive and first-aid treatments of all kinds. We found this man did not have enough authority and it would be an improvement to have more sergeants for this purpose, but in many cases a farrier, or even a private, by his own personality and from the line officers and men knowing he represented higher authority, acquired much of the authority and influence of an officer. The fact that these men were effectively used, and were appreciated by the troops, was well proved by the numbers of units which asked for one to be assigned, and by the objections made when one was withdrawn.

Nor does it seem reasonable to object to a trained enlisted man of the V. C. inspecting meat and food products. This was done by civilian laymen in some of the cantonments and has always been done by laymen of the B. A. I., so why shouldn't a soldier do it after instruction and experience under the commissioned meat inspector?

"Do medical officers prepare enlisted men of the Medical Corps for competition with medical men in civil life as unqualified practitioners?" Certainly not, but they do train them to act in their place, in the Army, so far as their qualifications permit, and not to do so would render the enlisted personnel useless. Everyone who served in the Army knows that the Hospital Corps men do a very large proportion of the treatments administered. Perhaps too much of the "pill dispensing" is done by them, but the M. O. cannot be everywhere at once, and has numerous duties besides treating the sick. And so it should be with the veterinary farriers—only let us try to improve the Corps by promoting these men to sergeant and giving them more authority, as in the British Veterinary Corps. They *must* be instructed "in diagnosis, therapeutics, theory and practice of veterinary medicine, meat and milk inspection, etc.," to properly perform their duties. If not informed on these matters, what in the world are they meant for? "Stable attendants to sound animals" is all they will be if not taught strictly veterinary work.

And why worry over the danger of their setting up as quacks, when every agricultural college is teaching hundreds of students courses in veterinary science and giving far more instruction than is necessary for these enlisted men? The question of quackery should not concern the Army, and will cease to be of importance to the profession when the latter measures up to the standards it should

be striving for. The more the knowledge of the care and treatment of animals is spread through our population, the greater will be the need for, and the demands on, the veterinary profession. Quackery has been based on the ignorance of these matters among the general public, the same as quackery in human medicine in the Middle Ages; and the more teaching and instruction given to soldiers, farmers, agricultural students, school-boys and school-girls in animal husbandry and elementary veterinary science, and in human health matters, the better off will be our animal population and the resources of the country.

In conclusion, the criticisms of Circular Letter No. 47 seem to me to be too theoretical and not based on practical experience with the veterinary service with troops.

EMLEN WOOD,
Ex-Captain, V. C., U. S. A., Division Veterinarian, 28th Division; Assistant State Veterinarian, South Carolina.

Columbia, S. C., November 15, 1920.

A REJOINDER TO THE FOREGOING

A consideration of Dr. Wood's letter and the original communication from the present writer shows in most respects what amounts only to a difference of opinion. But the essential thing is a difference in point of view with reference to the present and future status of the Veterinary Corps.

In the opinion of the present writer, the V. C. will never function properly until it has a general officer at its head. There are now veterinarians in and out of the Army that have the professional and administrative ability, the experience, the educational qualifications and the personality which would qualify them for the rank and duties of a B. G. Personality and executive ability are monopolized by no profession; these qualities are conferred even upon veterinarians. It is a maxim of pedagogy that *we learn by doing.* The only way to qualify a veterinarian as a general officer in command of the V. C. is to elevate a veterinarian to that position and allow him to function.

Dr. Wood states in regard to the V. C. that he believes "the best informed, and the conservative, veterinarians both in the Army and in civil life, consider that it is not yet ready to stand alone as a separate corps." If we adopt this opinion, it is presumably on the

ground that we have no men capable of heading such a corps. Such an idea seems to me a bit pessimistic; a sad thing, if true. If, as Dr. Wood says, the surgeon has more influence and authority than a V. O. can ever have, we must believe that the caduceus on the officer's collar stands for authority, but a V on the caduceus stands for authority Vetoed! It is conceivable that we may have better men in the future; if we make the progress we should make, we will have. In the meantime, however, we should stand ready to have the Veterinary Corps taken over by veterinarians at any time and should work to have it taken over. If we stand back and allow the V. C. to become thoroughly incorporated with the Medical Corps, a divorce from that Corps will become in due time impossible and will receive no consideration from army officers or Congress.

The V. C. is headed today toward permanent subordination to the Medical Corps or toward independence of function under a general officer. Our attitude as to the course it should take should be determined by our belief in the likelihood of its functioning most effectively as a subordinate or as an independent unit. If veterinarians can manage the V. C. better than non-veterinarians, we favor an independent corps; if they can not, then by all means let the Medical Corps furnish the requisite professional ability, personality and judgment which the veterinarian lacks. Waiting for veterinarians who are not general officers to prove in any other capacity that they should be general officers will automatically settle the question in favor of the permanent subordination of the V. C. to the Medical Corps. If veterinarians have no confidence in veterinarians, no one else will have.—M. C. H.

Brigadier General Frey, Chief Veterinarian of the French Army during the war and an honorary member of the A. V. M. A., has retired from active service and has been placed in the Reserve Section of Veterinary Inspectors.

Dr. Frank R. Osborn, who formerly practiced at Logansport, Ind., resigned from the Veterinary Corps of the Army in October and is now associated with the well-known veterinary firm of Merchant & Rice, Little Rock, Ark.

Dr. Harry C. Crawford has left for Oriental Park, Havana, Cuba, where he will have charge of several stables of Thoroughbreds.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus, Ohio, August 23 to 27, 1920

(Continued from the December JOURNAL*)*

SECTION ON GENERAL PRACTICE

TUESDAY MORNING, AUGUST 24, 1920

The meeting convened at 10 a. m., Dr. H. E. Bemis, Ames, Iowa, presiding.

CHAIRMAN'S REMARKS

THE CHAIRMAN: I have prepared a few remarks, not in any way in the nature of an address, as indicated on the program, but perhaps a few words which might be considered as a keynote.

The program of the Section on General Practice ought to be the one of most interest to the practicing veterinarian and in my opinion should be contributed to largely by him. It is, however, very difficult to obtain papers for the program from the practitioners, for the reason that they are very busy and not in the habit of writing. In preparing this program an effort was made to obtain papers from practitioners or those working on problems of direct interest to them, including practice on all species of animals and obtaining contributions from all sections of the country. This we were unable to do to our entire satisfaction, as some who at first promised were later forced by various circumstances to withdraw. To those who have contributed we wish now to express our thanks and hope that others will be encouraged to offer papers in the future.

To some practitioners the outlook for the future seems not to be encouraging, but to others, and I believe to the majority, the outlook never was better for real sound, sane practice based upon a thorough and accurate diagnosis and rational treatment. The kind of practice and the methods of practicing are changing, but always for the better. The more valuable animals are receiving better care, and as a consequence wire-cuts, kicks and acute indigestion are on the decrease, while dental operations and abdominal surgery are on the increase. We already have the specialist in bovine, swine, sheep and canine practice, and in a few instances specialists upon certain diseases. I believe the time is almost here when we will see practically the same division that obtains in human medicine, the rank and file doing general practice and minor surgery, while others establish hospitals for major surgery and the treatment of certain diseases. Even now valuable animals are being shipped long distances to such hospitals for special treatment. Nothing is too much

to do for a favorite dog or cat or for a valuable cow or hog worth from a few hundred to perhaps several thousands of dollars.

We need in these meetings a presentation of the problems which are met with and the experiences of the men who may have a solution of them, that we may all go back with more determination and better preparation to render a better service.

Since coming here I have heard some indications that there may be those interested in certain lines of practice who would like to have a separate section or possibly a separate organization. I have not talked this over carefully enough to come to any conclusion, but it seems to me that the more sections we might have, the more confusion we probably would have in our meetings, and that the small-animal man ought to be interested in the general program, and vice versa; so I hope that, in the future at least, the programs may be so arranged that the program of this one section will be of interest to all practitioners, whether they are specializing or whether they are in a more general practice.

This is merely my personal opinion, based perhaps upon the experience of the past year in obtaining contributions. It is difficult for one set of officers to keep in mind all who might be interested to prepare papers and have good material for a program of this section. They need a lot of help. The coöperation has been fine, and I think always will be, if we can only reach those who can do us the most good.

PRESENTATION OF PAPERS

CHAIRMAN BEMIS: In our sessions we will try to live up to the rules of the Association as to the twenty-minute limit on papers and five-minute limit on discussion; that is, five minutes for each one who may be discussing any particular paper. If any of the contributors have papers which take a longer time than twenty minutes, it is always possible for the Section to extend the time if the members so desire; so the practice will be that at the end of twenty minutes I will call to order and ask for the further pleasure of the members. I hope if I rap time on any of the contributors they will not take offense, but simply bear in mind that we are trying to run this session properly and to get through with the program so as to get the most good out of it.

We have to make a little change in our program. We will call first on Dr. Dykstra for his paper on "Anesthesia in Veterinary Operations."

(Dr. Dykstra read his paper, which was published in the JOURNAL for October, 1920, page 74.)

CHAIRMAN BEMIS: We will now go back to our first paper. Dr. Merillat informs me that he has changed the topic of his paper a little, but it will be on this same general topic, "The Comparison of French and American Practice."

(Dr. Merillat read his paper entitled "Some Notes on the Comparative Study of Veterinary Medicine in France and the United

States." It was published in the JOURNAL for October, 1920, page 64.)

CHAIRMAN BEMIS: I am sure we have been much interested. There probably will be no discussion, but I am sure if there are any questions Dr. Merillat will be glad to answer them. If there are no questions concerning this paper, our next will be by Dr. Udall on "Traumatic Indigestion in Cattle."

(Dr. Udall read his paper, which was illustrated with lantern slides. It will be published in a later issue of the JOURNAL.)

CHAIRMAN BEMIS: Dr. Murphey is ready now and will give a lantern demonstration illustrating "Some Practical Points on the Anatomy of the Ox and Pig."

(Dr. Murphey showed and explained a series of lantern slides.)

CHAIRMAN BEMIS: It seems that the anatomy of the inguinal region of the pig is becoming much more important nowadays because of the greater demand for surgery in this region, particularly in handling inguinal and scrotal hernias. We, at least, are getting a great demand along that line.

Adjournment.

SECTION ON GENERAL PRACTICE

WEDNESDAY AFTERNOON, AUGUST 25, 1920

The meeting convened at 1:30 p. m., Dr. H. E. Bemis presiding.

PRESENTATION OF PAPERS

THE CHAIRMAN: The first paper will be "Cæsarean Section in Swine," by Dr. W. E. Macklin.

(Dr. Macklin read his paper. It was published in the JOURNAL for November, 1920, page 197.)

CHAIRMAN BEMIS: The next paper is "Prolapse of the Vagina and Uterus in Brood Bitches and of the Rectum in Puppies: Their Causes and Treatment," by Dr. Flynn.

(Dr. Flynn read his paper, which was published in the JOURNAL for October, 1920, page 91.)

CHAIRMAN BEMIS: The next paper is on "Sclerostomiasis in Horses" by Dr. Covault.

(Dr. Covault read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN BEMIS: The last paper is the "Treatment of Cryptorchidism," by Dr. E. E. Wegner, of Pullman, Washington.

(Dr. Wegner read his paper, which was published in the JOURNAL for October, 1920, page 80.)

ELECTION OF OFFICERS

CHAIRMAN BEMIS: The election of officers is now in order. Nominations for Chairman are in order.

(Dr. Hoskins nominated Dr. Bemis as Chairman of the Section on General Practice, but Dr. Bemis declined the nomination.)

DR. N. L. NELSON (Ames, Iowa): I would like to nominate a practitioner as Chairman of the Section on General Practice, one whom you all know, Dr. Ferguson. (Seconded.)

(It was voted, on motion duly seconded, that the nominations be closed, and Dr. Ferguson was declared elected Chairman of the Section on General Practice.)

DR. DYKSTRA: I would like to place in nomination Dr. Muldoon for Secretary. For the information of those who do not know him, I want to say that he is a graduate of the New York Veterinary College. He has been in the Army. He has worked in Cornell University, and at the present time holds the Chair of Medicine in the Kansas Agricultural College. (Seconded by Dr. Lacroix.)

DR. FLYNN: I rise to second the nomination. I know Dr. Muldoon. He is a good man for that place. It should be a pleasure to second the nomination of a man, from my standpoint, who has been actively connected with the small-animal practice.

(It was voted, on motion duly seconded, that the nominations be closed, and Dr. Muldoon was declared elected Secretary of the Section on General Practice.)

DR. LACROIX: Is this the time and place for the election of a Sub-Chairman on Small-Animal Practice?

CHAIRMAN BEMIS: Dr. Muldoon being a small-animal man, I did not know whether that would be necessary. I don't know whether we might be going contrary to the rulings of the Association or not in establishing a sub-chairman.

DR. LACROIX: I think the Executive Board reported favorably on that.

DR. MERILLAT: That will be acted upon next year.

DR. STANGE: The Executive Board considered that matter and they thought it would be inadvisable to complicate these sections by providing for sub-sections, and we thought it would be better for the small-animal men and the others to get together in the same section, so that I don't think a sub-section in this section will be recommended.

The Executive Board has authority to provide and create sections. We also have a request for new sections in another direction, and we solved that by combining with one of the sections already existing. One of the reasons for doing that was very evident this afternoon by the small attendance in this section. If you split your sections still more, you will have still smaller attendance, and the Executive Board does not feel that it is advisable to make any more subdivisions which will mean still smaller sections, because you realize that every time you create a section in the Association you are increasing the expense of running the Association.

You have to think of all these things, and we believe that unless there is a bigger attendance at these sections it will be better to keep your work combined as much as possible. We instructed the Secretary of the Association to see that provision was made for the small-animal man in connection with this section.

DR. MERILLAT: I think that is a very good move. I think that almost every practitioner is almost as much interested in the small animals as the small-animal man. A great many of the practitioners have not had the opportunity to hear all the papers. When you hold meetings on these subjects alone, then the man interested in the other things is denied the benefit of the work we do.

DR. FLYNN: Take it from the standpoint of the small-animal practitioners, they haven't heretofore been getting very much out of the program. Take, for example, this afternoon, we had three papers on small-animal practice. Men who were not interested in small animals, in order to hear the other papers, had to sit and listen to the small-animal papers, and vice versa. Several of the small-animal practitioners have been considering forming an association so that they could compare ideas and get something of interest, and that didn't seem to meet with the approval of a great many. They wanted to get a sub-section or a branch here in which these subjects could be brought up and freely discussed, and let those interested in them attend, and get all out of them that they can. That is why the resolution was introduced to the Executive Board, and I will be frank with you, gentlemen, unless the small-animal practitioner has something of interest in these programs, there will be an association formed, and if it is formed, it will necessarily divide the attendance to some extent, which is not the wish of any small-animal practitioner. The small-animal practitioners want to come to these meetings, but they don't feel that heretofore they have had the recognition that is due them. That is partly due to the fact that they haven't asked for it, but they have asked for it this time. However, if the committee does not see fit to give them a sub-section, we will be satisfied with a satisfactory program. That is all we want, but we do want that.

DR. LACROIX: I don't want to be misunderstood. I didn't want to try to "railroad" anything through, and I didn't want to be misunderstood in regard to the report of the Executive Board.

DR. STANGE: The Executive Board is also confronted with a great many complaints that we are dividing up the program so much that the general practitioners can't get what they want. They find papers in that section and this section and they can't get to them. We are increasing the problem for the general practitioner. The Executive Board had not one side, but two, and we tried to arrive at a reasonable solution. We are thoroughly in sympathy with the small-animal men. I don't want them to feel that we are not interested in their request, but we had others to consider, and you must consider that we have to think of all those in our deliberations. We have been confronted by a number of those criticisms.

Adjournment.

SECTION ON SANITARY SCIENCE AND POLICE

TUESDAY MORNING, AUGUST 24, 1920

The meeting was called to order at 9:30 a. m. by the Chairman, Dr. L. Enos Day, of Chicago.

CHAIRMAN'S ADDRESS

CHAIRMAN DAY: It has been the custom that the chairman of this as well as of other sections of this Association present an address at the opening session of the Section. Since this precedent has been established, it is, no doubt, expected that I follow in the wake of those who preceded me. However, it is not my desire to burden you with an address in the true meaning of that word, but rather to make a few remarks on a subject of special interest to the veterinary profession in general and this Section in particular.

In viewing the present status of the veterinary profession from the standpoint of one who is not in regular practice, it appears to me that the present trend is toward preventive procedure rather than curative medicine. A decade or two ago the demands of our clients were toward measures to relieve individual sufferers of disease. Today we are called upon to prevent disease from spreading to entire herds and flocks and to prescribe measures intended to improve, if possible, the health and thriftiness of the animals, thus rendering them more profitable to the owner. The veterinarian of the future will act more and more in the capacity of a consultant along these lines than in the past. He must, therefore, be ready to cope with these duties which he will be called upon to perform.

Some years ago a movement was begun to place an agricultural adviser in properly organized agricultural counties making a request for same. This movement has had a steady growth from the start, and at the present time some of our leading agricultural States have an agricultural adviser in almost all of their counties, and I understand that the salaries paid these men are increasing and in keeping with the high cost of living. While there are cases where these advisers have made mistakes by attempting to advise the farmers and stock raisers concerning curative measures in the control of disease in flocks and herds, we must admit that the county agents, or, probably more properly speaking, the agricultural advisers, have rendered a vast amount of valuable service to the agricultural districts they serve.

Within the past year some of the more progressive counties have taken steps to secure the services of a veterinarian to work in coöperation with the agricultural adviser. The duties of the veterinarian are not to treat individual cases as individuals, but to advise with reference to quarantine and sanitary measures, animal husbandry, feeds and feeding, and concerning the best animal breeds adapted to the particular location. In counties where such veterinary advisers have been secured, apparently very satisfactory results have been obtained. If this movement acquires the confidence of the

people as the introduction of the agricultural adviser did, it will gain in adherents and it may not be long before every county that has an agricultural adviser will also have a veterinary adviser. With the economic value of farm and dairy animals and their products, and poultry and eggs, which more than equals that of the products of the soil, the farming communities will soon realize that the same protection must be afforded the former by the employment of a veterinary adviser as is rendered by the agricultural adviser on questions of crops, soil, etc. It will thus be seen that the time may not be far off when the veterinarians of this country will be called upon to extend their activities in a comparatively new field. We must, therefore, be ready for the occasion.

The veterinarian of the future must be given special training along the lines of sanitary science and police measures, as the demands along these particular lines will constantly increase in proportion to our increased knowledge of the etiology and dissemination of those diseases which were formerly quite obscure. In order to meet the requirements of the profession, a higher educational standard must be established for veterinary graduates and greater educational facilities must be provided for the study of veterinary science. A veterinarian to fill a position compatible with the future requirements of the profession must be one of high moral character and with a broad knowledge not only of matters pertaining to veterinary science but also allied sciences, and should be capable of making an address before an audience whenever the occasion demands. I am glad to note that some of our veterinary colleges have already seen the needs of this qualification and have added English and public speaking to their curriculums.

The American Veterinary Medical Association has always endeavored to keep abreast with the times in these respects. Two years ago at Philadelphia the matriculation requirements for veterinary students were raised to four years of high school or its equivalent, which was a step in the right direction. However, I feel that it will not be long before it will become necessary to make the entrance requirements even higher. In order to be on a level with the scientific men of the allied professions with whom the veterinarian becomes associated in his work, he must possess an equal fundamental education and a wider basic intellectual training than is required at the present time. Some of the other professions have made a two years' collegiate course a prerequisite to the study for the particular profession. The veterinary profession may be obliged to take similar steps in the near future. The standard of the veterinarian must keep pace with that of other professions, and this can be done only by requiring the veterinarian to possess a basic training appropriate to the importance of the duties he is to perform, and, as I endeavored to point out above, the field of activity of the veterinarian is constantly becoming broader and broader. The veterinarian of the future will, therefore, have to be one with sufficient training along the newly required lines above enumerated.

REPORT OF SECRETARY

CHAIRMAN DAY: The next in order will be the report of the Secretary, Dr. H. P. Hoskins, of Detroit, Mich.

DR. H. P. HOSKINS: There is really very little to incorporate in a report of this kind. Our Constitution and By-Laws do not impose very strenuous duties upon section secretaries other than securing and arranging programs for the sessions of the sections. Thanks to the hearty coöperation received from a number of our members, we have been enabled to present a very full program, perhaps the most comprehensive that has ever been offered to the Association. In the programs for the two sessions of this Section there are 23 papers and discussions listed. In addition to these our Section has contributed a major portion of the programs for the general sessions for Wednesday and Thursday. This was made possible through the nature of the papers, the subjects suggesting that they should be presented to the entire Association rather than any one section.

To the Bureau of Animal Industry veterinarians we offer our regrets for our inability to arrange the program of one session for the Government men. There being time on the program for only two separate sessions of this Section, it was found impossible to devote either one to the particular interests of the Bureau men. We believe, however, that they will find much to interest them throughout the program.

Your Secretary would like to reiterate the suggestions made by him on other occasions that some consideration be given to the creation of additional sections. As the work of the veterinarian becomes more diversified and more highly specialized, coincident with the growth of the Association in membership, the greater will be the need and the demand for more specialization in the programs. There has already been some discussion for the creation of a section for small-animal practice, and likewise a section for laboratory subjects, where papers of a somewhat technical character could be presented and discussed. One other suggestion is that members who wish to present papers should not be either modest or slow in making their offers to contribute. One reason why the programs of certain sessions appear unusually long is because some of the papers were offered after the section officers had practically completed their arrangement of the program.

Your section officers wish to acknowledge their indebtedness to and thank heartily all of the members who have lent their assistance in securing the papers presented, as well as the contributors themselves.

PRESENTATION OF PAPERS

CHAIRMAN DAY: We have something like thirteen or fourteen numbers on the program and I am going to ask you to make your discussions just as brief as possible, as well as the papers. It will take something like four hours if all the members take up twenty

minutes each who read papers, besides the discussion on them. We are going to confine ourselves to the twenty-minute rule.

The first paper on the program is "Eradicating Tuberculosis in Pennsylvania," by Dr. S. E. Bruner, of Harrisburg.

(Dr. Bruner read his paper, which was published in the JOURNAL for November, 1920, page 147.)

CHAIRMAN DAY: The next paper, entitled "Disposition of Tuberculous Cattle," will be given by Dr. O. H. Eliason, Madison, Wis.

(Dr. Eliason read his paper, which was published in the JOURNAL for November, 1920, page 155. During the reading of this paper the twenty-minute limit expired, and a motion prevailed permitting Dr. Eliason to finish his paper.)

CHAIRMAN DAY: The next paper on our program is "The Preparation of Tuberculins," by Drs. Fred Boerner, Jr., and Miller F. Barnes, of Philadelphia, Pa.

(This paper was read. It was published in the JOURNAL for November, 1920, page 160.)

CHAIRMAN DAY: The next paper, entitled "Combination Tuberculin Tests," will be read by Dr. Henry W. Turner, of New Hope, Pa.

(Dr. Turner read his paper, which was published in the JOURNAL for November, 1920, page 165.)

CHAIRMAN DAY: The next paper is "The Superiority of Combination Tuberculin Tests over any other Method," by Dr. L. B. Ernest, Washington, D. C.

DR. ERNEST: Before reading my paper I want to emphasize one point. No attempt is made in this paper to describe any of the methods. The facts given bear out the title of the text. In the preparation of any material for tuberculin, a wide field is presented. I shall include a brief report just received of a herd tested by the subcutaneous method sixty days prior to the injection of the ophthalmic and the intradermic tests.

(Dr. Ernest read his paper, which was published in the JOURNAL for November, 1920, page 173.)

CHAIRMAN DAY: The next paper will be "Activities of the Bureau Laboratories at Washington," by Dr. J. S. Buckley, Washington, D. C.

(Dr. Buckley read his paper, which will be published in a later issue of the JOURNAL.)

Dr. Kinsley offered a motion, which was duly seconded, that the rest of the papers appearing on the morning's program and not yet read be placed at the end of the program at the next session on August 25. Dr. Eichhorn objected to an amendment which was offered to place the papers not yet read at the beginning of the next session, and commented on the undue length of the program for one session. Dr. Hoskins, Secretary, explained that some of the papers were received after the program was made up and their authors were informed that they would be read if possible. Chair-

man Day said the Secretary's explanation was in keeping with the understanding of the Chair. The amendment was put to vote and declared by the Chairman to be lost. The previous question was then put to vote and carried.

The meeting then adjourned.

SECTION ON SANITARY SCIENCE AND POLICE

WEDNESDAY AFTERNOON, AUGUST 25, 1920

The meeting convened at 1:30 p. m., Dr. L. Enos Day presiding.

PRESENTATION OF PAPERS

CHAIRMAN DAY: According to the motion yesterday, we are to begin with the program today as printed. The first on the program will be the subject "Susceptibility to Cholera of Young Pigs from Immune Mothers," by Dr. E. M. Pickens, College Park, Md.

DR. PICKENS: I am afraid my paper is a little long for twenty minutes, so I am going to take the liberty of omitting the reading of the introduction, but I think after a little you will be able to get the run of the paper.

(Dr. Pickens's paper appears elsewhere in this issue of the JOURNAL.)

CHAIRMAN DAY: The next paper is entitled "Protozoan Forms and Their Relation to Diarrhea and Colitis in Shoats," by Dr. W. W. Dimock, Lexington, Ky.

DR. DIMOCK: In the preparation of this paper, I have tried to be conservative, by which I mean that I have tried to keep my enthusiasm within bounds. I have no chart, but will give you a summary of the tables I have prepared.

(Dr. Dimock's paper, as well as the discussion which followed, appears elsewhere in this issue of the JOURNAL.)

CHAIRMAN DAY: The next paper is "Field Observations in the Control of Infectious Swine Diseases," by Dr. M. Jacob, Nashville, Tenn.

(Dr. Jacob read his paper, which appears elsewhere in this issue of the JOURNAL. Time expired during the reading of this paper and a motion prevailed permitting Dr. Jacob to finish its reading.)

CHAIRMAN DAY: The next paper is by myself on the subject "Rhabdomyoma in Sheep." I am going to ask that this be read by title. I have some slides, however, to show you, and I will explain the pictures as they are thrown on the screen.

(The lantern slides were shown and explained by Dr. Day.)

ELECTION OF OFFICERS

CHAIRMAN DAY: This ends the program for the day, except the election of officers. Nominations for Chairman are first in order.

(Dr. H. W. Jakeman, of Indianapolis, was nominated, and a motion prevailed that nominations close. A motion prevailed instructing the Secretary to cast the entire vote of the membership for Dr. Jakeman, which was accordingly done.)

(Dr. H. Preston Hoskins, of Detroit, was placed in nomination to succeed himself as Secretary, but said he thought someone else should be recognized; whereupon the member nominating Dr. Hoskins withdrew his name and nominated Dr. B. T. Simms, of Corvalis, Oregon. A motion prevailed to close the nominations, and the Secretary was instructed to cast the entire vote of the Section for Dr. Simms for Secretary, which was accordingly done.)

Adjournment.

A. V. M. A. EXECUTIVE BOARD MEETINGS

THE Executive Board of the A. V. M. A. held a meeting at the Hotel La Salle, Chicago, Sunday evening, November 28, at 8 p. m. Those present were Chairman Hilton, Drs. Kinsley, Munce, Kiernan, Bennett, Stange and White. Doctor Lamb, of Colorado, came before the Board and presented the matter of the place for the next annual meeting in Colorado. After a careful consideration, it was voted that the 1921 annual meeting of the A. V. M. A. be held in Denver, Colo., September 5 to 9, inclusive.

It was also voted that the Secretary be authorized to charge $2.50 for copies of the A. V. M. A. directory to non-members of the Association.

At the suggestion of Treasurer Jacob, it was decided that the bonds of the Treasurer of the A. V. M. A. be increased to $25.000.

It was moved by Doctor Kinsley that Doctor Bennett and Secretary Mayo be appointed a committee to investigate the matter of appointing a body similar to the Council on Pharmacy and Chemistry of the American Medical Association and to report at the next meeting of the Executive Board in Colorado. Carried.

Doctor Munce moved that the Secretary be instructed to count only the official postal card vote as received. Carried.

Doctor Munce, as chairman of the subcommittee of the Board to consider the matter of combining the offices of Editor and Secretary, reported that the matter was still under consideration.

It was voted that the offer by Doctor Cary of a house and lot in Auburn, Ala., for the permanent home of the A. V. M. A. be received and filed for consideration at the next meeting of the Executive Board.

It was agreed that the Executive Board recommend to the Association at the next meeting that the Constitution and By-Laws be amended as follows:

Section 7, Article G, adding "excepting members residing in coun-

tries other than the United States and Canada, the said ballot shall be returned in ninety days after the date of issue," and also that in Article 11 of the by-laws, adding "excepting the Editor, Secretary, Business Manager and Treasurer, who shall assume their duties within thirty days following their election."

A second meeting of the Executive Board of the A. V. M. A. was held at the Hotel La Salle, December 1, at 2:30 p. m. The meeting was called to order by Chairman Hilton. Those present were Doctors Kiernan, Munce, Bennett, Stange, Kinsley and President White.

The Executive Board decided to recommend that Article IV, Section 1, of the Constitution and By-Laws be changed by striking out the words "within 60 days after the annual meeting."

Moved by Doctor Munce and seconded by Doctor Stange that the matter of a questionnaire on intradermic tuberculin test be referred to the committee on tuberculosis with power to act, it being understood that the expense of the committee was not to exceed their appropriation.

It was moved by Doctor Kiernan and seconded by Dr. Munce that Doctor Stange be appointed a sub-committee of one to confer with the Committee on Intelligence and Education with reference to the matter of educational publicity. Carried.

Doctors Kinsley and Bennett, who were a sub-committee to inspect the Secretary's office, reported as follows:

"As per your instructions, the undersigned visited the Secretary's office on November 30, and beg to submit the following report:

"The financial records of the A. V. M. A. are, in our judgment, maintained in an up-to-date businesslike manner, there being employed the various methods of rechecking all accounts, thus diminishing the possibility of error. The correspondence of the Association is conducted in a businesslike manner, files of same being maintained. Different lists of the names of members are maintained so they can be properly transferred and correct addresses preserved.

"We found the Secretary using office space of the company with which he is associated, and help is also employed on part time from the same company. This arrangement, we believe, is very economical and also efficient, the cost being much less than if a separate office were maintained."

There being no further business, the Board adjourned.

N. S. Mayo, *Secretary.*

OTHER MEETINGS

UNITED STATES LIVE STOCK SANITARY ASSOCIATION

The twenty-fourth annual meeting of this Association was held in Chicago, Illinois, November 29, 30, and December 1, 1920. The excellent program attracted a large attendance at every session and the meeting is regarded as one of the largest and most interesting in the history of the organization. A conservative estimate placed the attendance at from 450 to 500.

Owing to the death of President S. F. Musselman on October 26 and the absence of Dr. E. M. Ranck and Dr. F. A. Bolser, First and Second Vice-Presidents, on account of illness, the meeting was called to order with Dr. W. F. Crewe, Third Vice-President, in the chair.

The address of welcome was given by Mr. Thomas E. Wilson, President of Wilson & Company, in which he said in part:

"I think any city might be proud and would be proud to welcome your convention. Your work is national in scope, and while you are looking after the herds and flocks of the country, you are also protecting the health and the welfare of the American people.

"Much has been accomplished by the application of sanitary science in the livestock industry, that you men are more familiar with than I, but it has been with great satisfaction that I have followed to a considerable extent the work of the men of your profession—of your Association. Any one of the big things that you have done would be sufficient to justify your existence.

"Your efforts in the elimination of the fever tick, making it possible for our southern country to compete in the markets of the world with their livestock—that alone is sufficient, or would be sufficient compensation to justify your existence.

"Your efforts in the elimination of hog cholera is another work to your credit. Great wealth has been added to the country by the control of that dreaded disease.

"Scabies is another, but probably the most trying one that you have had contact with recently is foot-and-mouth disease. The very nature of the disease itself made it difficult, but the manner in which it was taken hold of by your profession and handled and controlled in conjunction with the Government was a very great credit to you.

"There is one other that you are working on today, and I hope and believe that the outcome of your gathering here will be the enlargement of the program in connection with this work, and that is the control of tuberculosis. I think if the amount of work and the accomplishment of this Association in that direction were known, you would not have me here to welcome you; you would have the citizenship of this great country here to applaud the work that you have done. But it is not known and you must take your satisfaction out of your own conscience and your own knowledge that you are accomplishing great things in that direction. Science has proven to us that that dreaded disease in animals is conveyed to human beings, and I think you men may feel satisfied in your own conscience and your own heart, if through your work in controlling that disease among the animals, you have stopped the transmission of that disease to just a few of our babies who are depending upon the cow as their foster-mother. You have sufficient satisfaction in that one thought to justify the work that you have done, and to encourage its continuance.

"There is one other germ that is threatening the life and the activity of the livestock industry, and that germ I think most of you men are familiar with. It is incubated by misinformation. That germ attacks one of the branches of the livestock industry. The serum for it, in my estimation, gentlemen, is confidence, which, unfortunately, is lacking to a very great extent in this industry. We must understand—this industry must understand the entire progress from calf to table, and you men are in a position to understand at least a portion of it; you are in a position to understand clearly the operation of the packing industry.

"As I said, gentlemen, much is left undone for you to do. You have made great strides; you have had considerable support from the State Governments and the Federal Government, but you have so well established yourselves now that I believe by the proper backing on your part, by the proper efforts for legislation such as you may require, it will be obtainable. And my express recommendation to you gentlemen is that you get back of the proposition, that you get back of the effort to legislate for necessary funds to carry on the work, to carry on your quarantine efforts, and that you get back of the Department of Agriculture, which, after all, has been the pathfinder in this work, and support them to the fullest extent."

In responding to the address of welcome, Mr. A. J. Glover, Editor of *Hoard's Dairyman*, stressed the progress that has been made in veterinary science and the benefits derived from the Association, and suggested that the trend of the meetings is too much toward veterinary subjects and not enough attention is being given to such matters as the handling, care, and feeding of farm animals to keep them healthy and strong. It was suggested by Mr. Glover that in future one day be set apart for discussing animal husbandry subjects and that two or three breeders be placed on the program.

The response to the address of welcome was followed by the reading of the minutes of the last meeting and the Secretary's report, after which the regular proceedings were suspended to devote the remainder of the forenoon period to memorial exercises for departed members.

Dr. Robert Graham of the University of Illinois, in speaking of our late and lamented President, said in part:

"He was one of America's foremost citizens in the work of livestock sanitarians. The esteem in which he was held by his fellowmen is vividly portrayed through the long years of confidence reposed in him by virtue of his office in the State Government of Kentucky, and any word of mine could not add to the many honors voluntarily conferred on him by this and other societies or social orders to which he belonged. A genial, wholesome and unselfish man whose first thoughts were of home, friends and duty. His friendship was a source of joy to all and his memory and likeness will always hold that lofty challenge to courage and duty that fires inspiration to right and noble living of which his life was a true example."

Hon. Joseph Mercer, Commissioner of Agriculture of Kansas, spoke of Dr. Musselman as a State official and the high esteem in which he was held by those with whom he came in official contact.

Dr. W. W. Dimock, of the Kentucky Agricultural Experiment Station, referred in a touching manner to Dr. Musselman's home life and the sterling qualities that characterized him as a courteous, considerate gentleman and capable practitioner, always firm in his stand for what he believed to be right and just and always ready to perform his duty.

Appropriate eulogies were delivered for other departed members, as follows:

Dr. Joseph Hughes by Dr. E. L. Quitman, Dr. J. F. DeVine and Mr. A. J. Glover;

Dr. E. M. Wiggs by Dr. C. A. Cary and Dr. L. G. Cloud;

Dr. S. E. Cosford by Dr. J. S. Koen;

Dr. John F. Winchester by Dr. Horace Hoskins;

Dr. George McEvers by Dr. A. T. Peters;

Dr. H. J. Beer by Dr. N. S. Mayo.

It is regretted that we have not space to publish all of the beautiful tributes paid to the members of the Association who passed away since the meeting a year ago.

During the reading of his paper on the "Progress of Coöperative Accredited Herd Testing," Dr. J. A. Kiernan called attention to the presence of Hon. Charles Sloan of Geneva, Nebraska, who introduced the original bills in Congress asking for appropriations for tuberculosis eradication and hog cholera control. In response to the request of the Association, Mr. Sloan delivered an interesting, forceful address in which he reviewed the history leading up to the action of Congress in making the appropriations. He paid a glowing tribute to the memory of the late Hon. James Wilson, formerly Secretary of Agriculture, who was so anxious to get tuberculosis and hog cholera eradication under way before the termination of his duties as Secretary. In referring to the rapid progress of tuberculosis eradication, Mr. Sloan thrilled the audience when he said: "The dreams of 'Uncle Jim' Wilson are coming true and the United States is leading in this great work." The part of Mr. Sloan's address referring to the economic and humane features of the fight against tuberculosis was especially impressive. Our yearly mortality from human tuberculosis is approximately 140,000. The gravity of the menace from this insidious plague is realized when we stop to consider that tuberculosis kills more human beings in the United States in one year than we lost altogether on battlefields, aboard ships, in army and navy hospitals and camps during the whole period of the recent war.

Other important papers on tuberculosis were presented by Drs. D. F. Luckey of Missouri, C. H. Case of Ohio, and W. J. Fretz of Minnesota.

During the afternoon session of November 30, Mr. Wayne Dinsmore, Secretary of the Horse Association of America, favored the Association with a brief address in which he presented strong arguments in favor of the horse and mule as the most reliable, economic

and effectual motive power on farms and for interrupted hauls and condemned the activities of those who are engaged in overzealous automobile propaganda.

The Report of the Committee on Infectious Swine Diseases was read by the Chairman, Dr. W. W. Dimock. On account of the chaos that has prevailed in field diagnosis, this report was received with more than ordinary interest. It was stated that hog cholera is the most important disease of swine and will continue to be. Veterinarians should have fundamental knowledge of pathology and bacteriology to attempt diagnosis. Procedures were suggested for diagnosing hog cholera and it was urged that all resources, including the laboratory, be used in making differential diagnoses. A very able supplementary report on Diagnosis of Pneumonia of Swine was read by Dr. R. R. Birch. In another supplementary report, Dr. Robert Jay discussed the subject of "breaks" following immunization of swine by virus and serum. In his discussion Dr. Jay cited an experiment in protein feeding conducted at the University of Tennessee, which aroused considerable interest.

Dr. T. P. White of the Bureau of Animal Industry, Chairman of the Committee on Hog Cholera Control, read the Report of that Committee. In a short preface Dr. White called attention to the fact that hog cholera in relation to the value of the swine industry should attract the same amount of effort for its eradication as in the case of other diseases of livestock. The report contained timely data and urged the coöperation and support of each member of the Association for renewed and determined action not only for the control of hog cholera but its elimination from American farms.

The Report of the Committee on Inter and Intra-State Shipment of Swine was read by Dr. U. G. Houck of the Bureau of Animal Industry. The Committee called attention to the variations that exist in the laws and regulations of the various States and urged that action be taken looking toward securing uniformity. A tentative outline of regulations was presented in the Report for the consideration of the Association, and, in conformity with the recommendations of the Committee, the following resolution was passed:

"Be it resolved, That a committee of seven State regulatory authorities representing the swine-growing sections of the United States be appointed and instructed to prepare regulations for the inter and intrastate movement of swine, to be reported at the next annual meeting of the United States Live Stock Sanitary Association."

Dr. J. I. Gibson, Chairman of the Committee on Resolutions, presented the following resolution, which was passed by the Association:

"Be it resolved by the United States Live Stock Sanitary Association, That we recommend that the livestock sanitary authorities of each State take steps to gather reliable information concerning the health of livestock in the State with definite information as to any and all existing outbreaks of communicable diseases, and that the information thus gathered be forwarded to the chief of the Bureau of Animal Industry, U. S. Department of Agriculture, with the request that the statistics and the information thus gathered be edited and published by the department and distributed to the various State sanitary boards in sufficient quantity so that distribution may be made among those interested in animal health and livestock sanitation in the various States."

In connection with the Report of the Committee on Tick Eradication a resolution was passed, providing:

"1st. That the national association of livestock sanitarians in convention assembled at Chicago in 1920, do hereby urge all States having infested territory to take measures and action to kill the last tick and thus speedily end this long-continued and costly war on the dangerous cattle tick.

"2d. That in order to force early action on the part of reluctant and inactive areas, we most earnestly request Congress to pass an act to prevent or prohibit the interstate movement of all cattle-tick-quarantined animals on and after March 1, 1922.

"3d. That each State officer and all others herein represented make special request of their respective Congressmen to support and pass such an act at the earliest possible date.

"4th. That the secretary have 500 copies of this resolution printed and a copy be sent to each Senator and Representative and to all the State officials."

Dr. A. W. Miller, of the Committee on Special Skin Diseases, read a very comprehensive report on the prevalence of the skin diseases of animals, especially scabies of sheep and cattle, in which he asserted that the scab mite cannot be killed by talk—it requires poison effectually applied to exterminate it.

Valuable papers on anthrax and scabies were then presented by Drs. A. Eichhorn of New York, and B. F. Davis of Wyoming, respectively.

The Report of the Committee on Live Stock Diseases was read by Dr. V. A. Moore. In this report attention was called to a noncontagious disease of cattle that has appeared in the State of New York, which is a puzzle to all who have observed it. Whether this is a new disease cannot be stated positively. Among the other diseases covered by the report were a lymphangitis of cattle which in some respects resembles tuberculosis, contagious abortion of swine, bovine botulism, exudative septicemia of geese, bowel trouble in cattle caused by coccidia, avian tuberculosis, and a nutritional disease of poultry investigated at the University of California.

A very creditable Report by the Committee on Abortion Disease was presented by Dr. Ward Giltner, the Chairman of the Committee, while the subject was further elaborated upon by the excellent papers of Drs. J. F. De Vine of New York, I. F. Huddleson of Michigan, and E. S. Good of Kentucky.

Before the closing of the meeting, the following officers were elected for the coming year:

Dr. W. F. Crewe, Bismarck, North Dakota, President, elected by acclamation.

Drs. R. W. Hoggan, J. H. McNeil, A. E. Bott, W. K. Lewis and P. Malcolm were elected vice-presidents.

Dr. Theodore A. Burnett of Columbus, Ohio, was elected Secretary-Treasurer.

From the viewpoints of attendance, interest, character and quality of papers and discussions, the meeting was a great success. The complete report will be published as usual by the Association.

SECOND ANNUAL GENERAL TUBERCULOSIS CONFERENCE

AT the Tuberculosis Conference held in Chicago, October, 1919, a strong sentiment was expressed in favor of making it an annual event. It may be advisable to have annual conferences, but as yet that policy has not been adopted. There were many things in connection with the tuberculosis eradication campaign to be discussed this year, and, obviously, there would be insufficient time to devote to detailed discussion of the work at the annual meeting of the United States Live Stock Sanitary Association. Therefore, after consultation with many State livestock sanitary officials it was decided to hold another conference in Chicago, November 27, 1920.

There were a larger number of States represented at the second

conference than at the one held in 1919. On the first day of the meeting, when a vote was taken on the report of the tuberculin test committee, 42 States were represented. The principal item of discussion was the report of the committee on tuberculin tests. This discussion consumed the greater part of the first day's session, but it was time well spent, in view of the fact that a definite plan was rounded out and adopted. This report dealt particularly with the intradermic test. The report was referred to the United States Live Stock Sanitary Association, and on December 1, 1920, the recommendation made by the Tuberculosis Conference was adopted after a few minor changes had been made.

The effect of the action taken on the uniform accredited-herd plan is to amend Sections 1, 6 and 14, as follows: Section 1 as adopted by the Live Stock Sanitary Association in December, 1920, reads as follows:

"1. A tuberculosis-free accredited herd is one in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tests, and by physical examination, applied by a veterinary inspector of the United States Bureau of Animal Industry or a regularly employed veterinary inspector of the State in which cooperative tuberculosis eradication work is conducted by the United States Department of Agriculture and the State.

"Section (*a*). The subcutaneous, intradermic and ophthalmic methods of applying the tuberculin test are approved.

"Section (*b*). The initial testing in accredited-herd work may be by either the subcutaneous or intradermic method, but the ophthalmic method shall only be used in combination with the subcutaneous or intradermic method.

"Section (*c*). The final test on herds shall be by such combination of methods as may be deemed most advisable by the State and Federal officials."

The amendment made to Section 6 in brief is that officially accredited herds shall, when ordered by the livestock sanitary officials of the State, be tuberculin tested by any veterinarian whose name is upon the accredited list of veterinarians approved of by the United States Bureau of Animal Industry and the State for that purpose.

These veterinarians can only qualify for accredited-herd work by passing a satisfactory examination.

Section 14 of the uniform plan was amended by adding paragraph 3:

"After the bull is no longer used in the herd, that herd may be fully accredited after two successful tuberculin tests applied not less than six months apart."

Other phases of the accredited-herd plan were discussed fully by the Conference, and many constructive points were brought out and agreed upon.

The Conference was a very successful one, and should there be occasion for holding another in 1921, no doubt the livestock sanitary officials of the respective states would attend in large numbers.

WESTERN PENNSYLVANIA VETERINARY CLUB

THE Western Pennsylvania Veterinary Club held its regular meeting October 19 at the John A. Bell Livestock Farm, Coraopolis Heights, Pennsylvania. The club was very grateful to Mr. Bell for this opportunity, for the courteous and generous entertainment, and for the excellent dinner served to all at his farm hotel.

Mr. Bell is President of the Pennsylvania Holstein-Friesian Association and has a herd of about 160, which consists of well-selected individuals from championship families. Besides the cattle he has other good examples of purebred livestock. It is his aim to make this the leading Holstein-Friesian herd. The buildings are well located and well arranged on high and dry land, an excellent view, with good facilities for drainage, and with a ventilating system which is simple, unique and efficient.

The greater part of the afternoon was devoted to a judging contest conducted by Dr. G. A. Dick, Professor of Animal Industry of the Veterinary Department of the University of Pennsylvania, who discussed the dairy type to the gratification of those present and placed the four cows which were used for the contest in their proper classes after every person had been given the opportunity to place them and mark a score-card which was furnished. Two castration operations were performed by Dr. F. A. Marshall, assisted by Dr. S. E. Young, who is the resident veterinarian.

The Western Pennsylvania Club was the first veterinary club organized in Pennsylvania, of which there are seven at the present time. This was probably the first veterinary club meeting of this character. There were fifty-two present.

The following guests were present: T. E. Munce, State Veterinarian, Pennsylvania; Dr. L. A. Merillat, Orrville, Ohio; Prof. G. A. Dick, University of Pennsylvania; M. C. Gilpin, Assistant Editor of the *National Stockman and Farmer;* Dr. H. W. Turner,

New Hope; M. F. Barnes, Philadelphia; G. A. Burdick, of the F. R. Babcock Holstein-Friesian Farm, Valinca, and the superintendent of Mary Vale Jersey Farm, Sharon, Pennsylvania.

FRED WEITZEL, *Secretary.*

CHICAGO LIVESTOCK EXCHANGE BANQUET

ON Monday evening, November 29, the Chicago Live Stock Exchange acted as host to a large number of State and bureau officials, as well as representatives from all of the purebred cattle breeding associations. A beefsteak dinner was served, followed by addresses on the subject of tuberculosis. The Hon. E. C. Brown, President, American National Live Stock Exchanges, acted as toastmaster, and in stating the purpose of the banquet set forth indisputable facts regarding the prevalence of tuberculosis, and the necessity of continuing and increasing the forces that are now waging the fight against that insidious disease.

President M. D. Munn, of the American Jersey Cattle Club, sounded the keynote of the evening when he declared that the accredited-herd plan should be kept at the very highest standard possible, and that no herd should be kept upon the accredited list if tuberculous animals are subsequently found in it.

Mr. T. E. Wilson, head of the well-known packing concern, stated that he had great confidence in the campaign which was now being waged against tuberculosis, and was giving it his support in every direction.

Among the other speakers were ex-Congressman Sloan; Commissioner Hogue of New York; Commissioner Norgard of Wisconsin; President Stafford, Chicago Live Stock Exchange; Livestock Commissioner H. R. Smith; George E. Martin, *Breeders' Gazette;* State Veterinarian Spencer of Nebraska; J. Scott of the Illinois Farm Bureau; Drs. J. A. Kiernan and J. R. Mohler.

UTAH VETERINARY MEDICAL ASSOCIATION

THE tenth annual meeting of the Utah Veterinary Medical Association was held in the Capitol Building, Salt Lake City, October 7.

The meeting was called to order at 10 a. m. by President Parker.

Dr. R. W. Hoggan, State Inspector of Live Stock, addressed the members on matters of general interest, and thanked them for their assistance.

Dr. D. J. Hickey of the B. A. I. represented Dr. F. E. Murray, in charge of field work in Utah, who was unable to be present, and spoke on the ophthalmic test of cattle for the detection of tuberculosis.

Informal talks were made by several members. A number of new members were elected. The Secretary reported the financial condition of the association as satisfactory.

The following officers were reëlected for the ensuing year:

Dr. Frank Parker, Ogden, President; Dr. W. H. Hendricks, Richmond, Vice-President; Dr. E. A. Bundy, Ogden, Sec.-Treas.

A schedule of prices for certain lines of work was adopted.

The members expressed themselves as in favor of a winter meeting and clinic.

E. A. BUNDY, *Secretary.*

FLORIDA VETERINARY MEDICAL ASSOCIATION

THIS meeting, which was held at the Seminole Hotel, Jacksonville, Florida, November 22, was first an impromptu affair, called by Dr. Schofield of Miami. His call resulted in a representative gathering of Florida veterinarians and veterinarians in the services of the Department of Agriculture and State Live Stock Sanitary Board. It had the desired effect of bringing the Florida Veterinary Medical Association again into life.

The first question before the preliminary meeting was whether to continue the old organization or to reorganize.

A majority vote decided to continue the old organization and Dr. Charles F. Dawson, as President, called a regular meeting of the Florida Veterinary Medical Association to order. Roll call showed the following members and visitors present: Dr. Charles F. Dawson, Pres.; Dr. W. J. Tanner, Vice Pres.; Dr. Fred. W. Porter, Sec.-Treas.; Dr. W. P. Link, Dr. Major Schofield, Dr. G. S. Davis, Dr. J. W. DeMilly.

Minutes of the previous meeting at Gainsville, Fla., Jan. 18, 1917, were read and adopted.

The financial report, read by the Treasurer, and showing a cash balance of a little more than fifty dollars, was accepted.

Dr. A. L. Shealy, of the University of Florida, asked for the assistance and coöperation of the professional men throughout the State for his department at the U. of F., stating that he already had the nucleus for a diagnostic laboratory, with a stock of small ex-

perimental animals, and would be glad to do diagnostic work if specimens were sent to his department.

Dr. Dawson spoke of the need of a qualified veterinary bacteriologist.

Discussion brought out the dangers of abortion disease to both dairy and beef cattle of the State. The advisability of the agglutination and fixation tests on cattle for importation into the State brought out statements that the Sanitary Board had power to impose these tests and to require certification of tests before cattle were allowed to enter the State. It is not known that any other State makes this requirement.

It was moved by Dr. Dawson that the B. A. I. be asked to give protection against this disease and to prohibit interstate movement without certificate of tests. Carried.

General discussion on a local condition known as "salt sick" showed this to be an anemic condition, brought about by many causes, notably intestinal parasites, especially uncinaria, chronic tick-fever, poor pasturage or feed, unsanitary stabling, etc., which could be successfully handled, when not too far advanced, by tonics containing iron, change of local conditions and change of pasture.

The discussion of the use of thymol versus chenopodium against internal parasites, favored thymol. Chenopodium was believed to be safer for dogs than for cattle.

Discussion of "blacktongue" of dogs showed it to be a canine typhus, which would yield to intestinal antiseptics.

The question of a veterinary practice act being brought up, it was moved and seconded that the president appoint a committee to draft such an act, with power to appoint a representative at the coming legislative meeting and expend necessary funds to get such act on our statute books. The president appointed Drs. Schofield, Porter, Tanner, Link, Shuminiger, DeMilly and Houchin.

All B. A. I. men were invited to become honorary members of this association, with full privileges of membership but no dues.

On motion, Dr. Schofield was reimbursed for his expenses in calling the meeting.

All membership dues since meeting of 1917 were remitted.

The following officers were unanimously elected for the ensuing year: Dr. Charles F. Dawson, President; Dr. Major Schofield, Vice President; Dr. Fred. W. Porter, Sec.-Treasurer.

On presentation of petitions for membership, the following named men were voted on and declared elected as members:

R. C. Shuminiger, H. Bannister, S. C. Smode, B. A. M. Brayer, G. E. Pace, Arthur S. Houchin, E. L. Reed, H. M. Clarrol, J. W. Etheridge, A. L. Shealy, Paul Fischer, H. C. Nichols, and M. J. Ernest.

The President was instructed to call the next meeting some time within the next twelve months, the date, place of meeting and hour to be selected by him. FRED. W. PORTER, *Secretary.*

VETERINARY CLUB OF PHILADELPHIA

THE Veterinary Club of Philadelphia held its monthly meeting on Tuesday evening, November 23, at the Veterinary School, University of Pennsylvania, with a large attendance. Dr. George H. Hart, of California, at present in charge of Veterinary Extension at the Veterinary Department, U. of P., gave a very interesting talk about the veterinary activities in California, and the opportunities for veterinarians in that State, especially in the treatment of food producing animals, and also in the control of contagious diseases, such as anthrax and scabies, which appear to be more prevalent in the dry season. C. S. ROCKWELL, *Secretary.*

MASSACHUSETTS VETERINARY ASSOCIATION

THE regular monthly meeting of the Massachusetts Veterinary Association was held at the New American House, Boston, Mass., Wednesday evening, November 24. Dr. E. T. Ryan presided. The meeting was given over to the discussion of interesting cases.

Dr. E. T. Harrington, the Massachusetts Secretary of the American Veterinary Medical Association, was present.

HARRIE W. PEIRCE, *Secretary.*

VETERINARY INSPECTORS' ASSOCIATION OF ILLINOIS

A MEETING of the Illinois State Veterinary Inspectors' Association was held in B. A. I. Hall, Drovers' National Bank Building, Chicago, for the purpose of discussing methods of procedure by the legislative committee relative to the Reclassification Report.

The meeting was attended by the largest number of members

present at any of our previous meetings this year and seemed to be of unusual interest to every member present.

The question of reclassification of government employees and the slogan of our National President, Dr. N. L. Townsend, for 100 per cent membership were the principal topics of discussion.

A legislative committee was appointed by our president, Dr. J. H. Whalen, consisting of the following members: Drs. W. N. Neil, Chairman; H. B. Raffensperger, G. M. Otis, Thomas Quincy, R. A. Moonan. This committee was appointed at the suggestion of the Chairman of the Committee on Legislation and Publicity, Dr. J. A. Kiernan, for the purpose of having an interview of sufficient length that the whole subject of reclassification and the injustice received by the veterinarians could be taken up in detail with the president of the Live Stock Exchange, the Editor of the *Breeders' Gazette*, the American Aberdeen Angus Breeders' Association, the Farmers' Bureau, Hon. William Graham of Illinois, who is on the Committee on Civil Service Reform in the House of Representatives, and Hon. Lawrence Y. Sherman of Illinois, who is on the Committee on Appropriations in the United States Senate, to try to secure a just reclassification for the B. A. I. veterinarians.

All of the members present pledged their support unanimously to Dr. W. N. Neil as chairman of the legislative committee with a 100 per cent membership from the Chicago Branch of the Illinois State Association.

The question of securing the membership of all Federal and State veterinarians was raised by the Secretary and Dr. A. A. Swaim, our Zone Vice President, called our attention to Article 3, Section 2, of our constitution which states that only veterinarians employed by the Bureau of Animal Industry can become active members of our association and further stated that we should make every effort possible to secure the membership of all Federal veterinarians, in serum and virus control, hog cholera control, and tuberculosis eradication in the State of Illinois and keep these men informed of the interest and proceedings of the association.

Dr. A. A. Swaim also approved Dr. S. J. Walkley's news letter and stated that he had ordered copies for every Federal veterinarian in the Central Zone who was not a member of our National Association for the purpose of stimulating interest and helping to secure their membership.

There was a motion made, regularly seconded and passed that the

Secretary of the Illinois State Association send a brief outline of the proceedings of our meetings to the National Secretary of our association, Dr. S. J. Walkley, the Editor of the A. V. M. A. JOURNAL and Editor of *Veterinary Medicine.*

Dr. W. N. Neil reminded us of the seriousness of the classification that we have been given. He pointed out a few of the other classes of civil employes which showed very clearly that the veterinarians had been given a very unjust classification and stated that the Reclassification Commission had given us the old "Horse Doctor slap in the face" and that we should not remain silent and let Congress pass the Reclassification Bill, but should fight for our rights before the bill passed the Congressional Committee.

Dr. L. Enos Day stated in a few words that every man who had a diploma from a recognized veterinary college should be interested in a just classification by the Reclassification Committee, for it sets the standard of veterinarians not only in the B. A. I., but for all State veterinarians and the profession in general. Dr. Day also reminded us of a few things that the A. V. M. A. was doing for the advancement of our profession and the standard it was setting for the veterinary profession.

Dr. M. Guillaume stated that we should make preparations to have a lively meeting of the Illinois State Veterinary Inspectors' Association during the National Live Stock show and try to interest some of the livestock men and the U. S. Live Stock Sanitary Association in giving us some support on the Reclassification Report.

Our president, Dr. J. H. Whalen, in his closing remarks, reminded the members that they were not to forget their pledge to the chairman of our committee, Dr. W. N. Neil, but that they should give the committee all of the suggestions they had and help in securing the membership of every veterinarian on the force.

L. T. HOPKINS, *Secretary.*

D. C. DIVISION OF B. A. I. VETERINARIANS

The regular meeting of the District of Columbia Division of the Bureau of Animal Industry Veterinarians on the evening of November 10 was made the occasion for a pleasant gathering at one of the local hotels in Washington, D. C., where a repast was served and appropriate entertainment provided and enjoyed. Dr. John R. Mohler, Chief of the Bureau, and Dr. J. Franklin Meyer, of the Bureau of Standards, were guests. Dr. J. A. Kiernan, Chief of the

Tuberculosis Eradication Division of the B. A. I., acted as toastmaster, and addresses were delivered by Dr. Mohler, Dr. R. A. Ramsay, President of the District Division of the Association, and Dr. Meyer, who spoke on the work of the Reclassification Commission, with which he was associated during its official existence. Dr. D. I. Skidmore, who was a delegate at the annual meeting of the National Association, read his report of the proceeding at Columbus.

Films of the Department of Agriculture, depicting a day of celebration among the cowboys of the West, were shown, the celebration consisting of "broncho busting," roping and throwing cattle, and other Wild West stunts. A number of difficult and mystifying feats in legerdemain were performed by one of the members of the local meat-inspection force. A part of this phase of the entertainment bordered on the tragic when one of the Bureau officials relaxed his hold on a 50-cent piece to help in the work of the magician. For a time there was a possibility that the money would not be recovered, but it was finally located in a small box wrapped in "red tape." Sighs of relief were noted.

Those present were so well pleased with the evening's entertainment and the general good fellowship prevailing that it was voted to have a series of these social meetings during the winter at which the wives of the members would be in attendance. The meeting afforded a realization that all work and no play makes the veterinarian a dull boy.

Dr. M. H. McKillip, who has been in active practice in Chicago for many years, has left for De Land, Florida, where he will spend the winter enjoying a well-earned vacation.

Another Chicago practitioner who will shortly leave for a six months' vacation in Florida is Dr. D. M. Campbell, Editor of *Veterinary Medicine*. Dr. Campbell is anticipating much pleasure as a follower of Izaak Walton in the waters about St. Petersburg.

Dr. Mazyck P. Ravenel, formerly associated with the late Dr. Leonard Pearson at the Veterinary Department of the University of Pennsylvania, and more recently President of the United States Livestock Sanitary Association, has been elected to the Presidency of the American Public Health Association. Dr. Ravenel is also an honorary member of the A. V. M. A.

NECROLOGY

DR. WILLIAM A. DUNBAR

THE Veterinary Association of Manitoba, Canada, recently lost its oldest and one of its most highly respected members in the death of Dr. William A. Dunbar, which occurred October 15, 1920.

Dr. Dunbar was born in Aberdeenshire, Scotland, in 1841. He came to Canada in 1858 and for a considerable time carried on his trade of horse-shoeing, later entering the Ontario Veterinary College and graduating in the class of 1876. He went to Winnipeg early in 1882 and carried on the practice of his profession with considerable vigor up to the time of his death. He took a deep interest in the affairs of his local association and occupied all the offices in the organization at different times during his membership of over 38 years.

Dr. Dunbar was one of the charter members of Clan Stuart (Society of Scotland) and also took an active part in all its deliberations. He was very fond of Scottish lore and also had a good acquaintance with the Gaelic tongue. He will be greatly missed by those who enjoyed the privilege of knowing him intimately and who came in contact with him in the discharge of their duties.

The late doctor celebrated his golden wedding anniversary in 1916. He leaves a widow, a sister and one grandson to mourn his loss.

W. A. HILLIARD.

BROTHER OF DEAN HOSKINS DEAD

A cablegram has been received by Dean W. Horace Hoskins, of the Veterinary College of New York University, announcing the death of his brother, the Rev. Franklin Evans Hoskins, in Beirut, Syria, where he did missionary work for thirty years in connection with the Presbyterian Board of Foreign Missions, and extensive work with various editions of the Arabic Bible.

"Who's Who" states that the Rev. Franklin E. Hoskins was born in Rockdale, Delaware County, Pa., September 28, 1858. He received the degree of A. B. from Princeton in 1883 and his A. M. in 1886. He was graduated from the Union Theological Seminary and received honorary degree of doctor of divinity from New York University in 1903. He was editor of the American Mission Press in Syria, honorary life director of the American Bible Association,

member of the Victoria Institute of Great Britain, honorary director of British Relief in Palestine, and commissioner of Syria and Palestine Relief, 1914-1918. He was the author of "From the Nile to Nebo," a great work dealing with his explorations, and with Prof. William Libbey wrote "Jordan Valley and Petra."

DR. V. A. NORGAARD

Dr. Victor A. Nörgaard, Territorial Veterinarian of Hawaii, died on November 16 as the result of a revolver shot through the heart, apparently self-inflicted. Despondency due to ill health during the past year is believed to have been the cause.

Dr. Nörgaard was born at Copenhagen, Denmark, November 4, 1868, and graduated from the Royal Veterinary College in that city in 1889. After coming to the United States in 1890 he practiced veterinary medicine first in Massachusetts and later in Wisconsin, becoming an inspector in the Federal meat-inspection service at Chicago in 1891. In 1893 he was transferred to the Pathological Division of the Bureau of Animal Industry at Washington, where he investigated various outbreaks of disease and tested various dips for cattle ticks and remedies for hog cholera and actinomycosis. In 1896 he became Chief of that Division and at once started to improve on Kitt's blackleg vaccine, which resulted in the method that is still being used for preparing Government blackleg vaccine. He represented the United States Department of Agriculture at the Seventh International Veterinary Congress at Baden-Baden in 1899. In 1902 he resigned from the Bureau to take a commercial position with the West Disinfecting Company and three years later moved to Honolulu after receiving the appointment of Territorial Veterinarian, which he held until his death.

Dr. Nörgaard was a kind, courteous, and very helpful executive, a capable veterinarian of wide experience, and the author of numerous articles on contagious diseases of livestock.

ARTHUR WILFRED SHILSTON, OF INDIA

By the death of A. W. Shilston, from acute glanders, at the early age of 34, veterinary science in India has lost one of its most promising and valuable workers. In research and in routine work Shilston gave of his best. He had the true gift for research—foresight and rational imagination coupled with patience, perseverance and an infinite capacity for attention to detail. In routine he

was prompt and resourceful. In both of these fields of work India is deeply indebted to him.

Shilston entered the Royal Veterinary College, London, in October, 1904, and took his diploma in July, 1908. His college career was brilliant and he was a marked man from the time he entered. Shortly after obtaining his diploma he was appointed to the Veterinary Research Laboratory at Pietermaritzburg, Natal, first as assistant to Colonel Pitchford, and subsequently in charge. In March, 1914, after a brief period of five weeks spent in England, he took up the appointment of Assistant Bacteriologist at the Muktesar Laboratories under Colonel Holmes. From February, 1915, till October, 1916, Shilston officiated as Imperial Bacteriologist and afterwards held the appointment of Second Bacteriologist up to his death.

In Africa Shilston did valuable work in connection with the sheep scab, piroplasmosis, East Coast fever, and the production of anti-snake-venom serum. In India his energies were devoted to problems connected mainly with rinderpest, surra and dourine, and much valuable work in these subjects stands to his credit. Shilston first became ill on June 17th, and as he failed to make satisfactory progress he was sent on to Naini Tal on the 21st. The disease from which he was suffering steadily progressed and terminated fatally on July 6th. It can truly be said that his life was sacrificed to his work.—*The Agricultural Journal of India.*

Dr. F. M. Potter, veterinarian of the New York Hippodrome and the owner of a number of well-known Thoroughbreds, was burned to death on December 1 in his apartment house in New York City. Dr. Potter had just returned from Bowie, Md., where he supervised the shipping of some of his color-bearers to the New Orleans race track.

"Foot-and-mouth disease is making wide ravages among cattle in Bavaria, Southern Germany. The estimated loss to July 17 was 50,000,000 marks."—*National Stockman and Farmer.*

Arrangements have been made for exporting 35,000 head of Texas cows to Germany for the purpose of rehabilitating the depleted herds of that country. . . . The matter was taken up with the Government and the necessary permission for the exportation of the animals was obtained. It is stated that all cattle will be dipped according to the Federal regulations."—*Hoard's Dairyman.*

MISCELLANEOUS

COMBATING FOOT-AND-MOUTH DISEASE IN ENGLAND

WHENEVER a series of outbreaks of foot-and-mouth disease occurs in this country it is safe to say that somebody will protest against the policy employed for its suppression; as recently as last month three such protests from agricultural societies were sent to the Ministry from various parts of the country.

It should be understood at the outset that the principle of immediate slaughter is the most scientific method, in the sense that in accordance with the knowledge of the day it promises the greatest measure of success and embodies the results of the latest knowledge that has been acquired. Carefully considered, it may claim a very large measure of success, as will be seen by reference to what took place before the policy of immediate slaughter was adopted. Between 1877 and 1884, Great Britain suffered from a very severe visitation. As no slaughter policy was then in vogue, and contact animals were allowed to remain at large, the number of outbreaks per annum varied during those disastrous years from 858 to 18,732. In one year alone, 400,000 animals were affected. It is, of course, well known that foot-and-mouth disease may be cured. A mortality of 20 per cent in a serious outbreak is considered high, but if initial disease centers are not completely and immediately eradicated, the disease will spread to considerable distances, and something akin to a general invasion of the countryside may ensue. Should such a trouble occur, it is estimated that the direct loss to farmers in this country would be at least three million pounds, while the country, in all probability, would suffer from a milk famine and the export trade of pedigree livestock would come to an end. In this connection, it should be pointed out that countries importing pedigree stock from Great Britain almost invariably require certificates to the effect that the whole of the country, or the county or the district from which the animals are sent, is and has been free from foot-and-mouth disease for a definite period before exportation.

It will be understood that in view of the extraordinary infectivity of the virus of foot-and-mouth disease, which is ultramicroscopic and is thought by many people to be air borne, it is extremely dangerous to run risks by keeping infective animals alive and attempting cures. Little doubt exists about the possibility of curing a

sick animal, as has been pointed out above, but while the cure is in progress the disease may spread far and wide. In countries like the Argentine, where the slaughter policy is not adopted, it is said that during a recent outbreak some farmers lost more than half their cattle. So great is the importance attached to immediate destruction of affected animals by the Veterinary Branch of the Ministry of Agriculture, that officials are on duty night and day. It often happens that the news of a suspected outbreak reaching the Ministry in the evening is telegraphed to a veterinary inspector during the night, so that, as soon as his confirmation is obtained, a closed area may be established, affected and contact animals immediately destroyed, the carcasses burned and the premises disinfected. In this way and in no other was it possible to keep the serious visitation of the past few months within bounds.—*The Dairy World*, London.

SEVENTY-FOUR HERDS TAKEN FROM ACCREDITED LIST

SINCE the beginning of the work, about three years ago, 74 herds of cattle have been removed from the list accredited as being free from tuberculosis. The presence of one or more reactors was the cause for removal. The number of herds taken off the list is small compared with the total number of accredited herds, which now exceeds 4,000. In most cases reinfection was traced to carelessness. Either the accredited animals had been permitted to run in pastures with infected cattle or else animals of doubtful health had been brought on the premises and stabled with the others. This is in violation of the agreement which the owner signs when he applies to have his herd tested. In one instance a breeder with an accredited herd purchased an entire herd whose history he knew little about. About half of the animals bought reacted to the tuberculin test when it was applied. But instead of segregating for a time those which did not react, he immediately added them to his officially accredited herd. This was one of the herds taken from the list following the discovery of several reactors. In only 5 instances out of the 74 "discredited" herds the presence of reactors could not be explained. This is considered a small number in proportion to the nation-wide extent of the work.

Where only one reactor is found in an accredited herd it is possible for that herd to get back on the list again within six months if a retest at that time shows the herd to be clean. When several

reactors are found it takes from a year to a year and a half for the herd to become accredited again. In all cases reactors must have been removed.

There is increasing evidence also that cattle which, though not reactors, are "suspicious" should be looked upon as a constant source of danger. Frequently the disease is so far advanced in such cattle that they fail to respond to the test, yet are more dangerous to the herd than some reactors. Suspicious animals can not be officially condemned, but breeders who are familiar with the situation sometimes permit them to be slaughtered rather than jeopardize the health of other animals.

Another important precaution in tuberculosis-eradication work is the protection of cattle at fairs and exhibitions. Owners of accredited herds are now demanding that such herds at least be kept in separate barns so that they will not have to mingle with untested cattle. Some fair associations have gone so far as to require a tuberculin-test certificate for all cattle shown.

Dr. N. S. Mayo writes in the *Breeder's Gazette*:

"When *Tales from the Bar X Horse Camp* came I did not dare open it at the office, but at home, after supper, I wandered to scenes 'far away and long ago.' Toward sunset the cattle came drifting slowly in to water, and the horses, with streaks of sweat and dirt, were standing belly-deep in the river drinking, as we shifted in the saddle and looked anxiously toward some cottonwoods, where wood smoke drifted lazily away, and we wondered why that 'dod-blanked' cook didn't holler 'grub pile'; but what's the use, when one is 'hog-tied' in a city? It's like trying to get a chance to say 'How' over the bar of the 'Palace Saloon.' We can, however, light a pipe to Will C. Barnes, and hope that many other delightful stories from the short-grass country will come drifting in before he hits the grit alone on the long, long trail."

"This is a joyful life if you don't weaken." Thus spoke a prominent veterinarian as he emerged from the Kissimee River, down whose steep bank he was precipitated into six feet of water, when the automobile he was in became mired in the quicksand and it was necessary for all hands to get out and push. This is the kind of joyrides that Congressmen tell about in their *Congressional Record*, but Dr. R. A. Ramsay and Dr. E. M. Nighbert believe the joy is more in the telling of such experiences than in their actual participation.

VETERINARY ASSOCIATIONS

Secretaries of Veterinary Associations are requested to coöperate with us in keeping this directory up to date.

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y.
Alabama Vet. Med. Ass'n		Birmingham	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.		Columbus	W. R. Hobbs, care O. S. U Columbus, Ohio
Alumni Ass'n N. Y.- A. V. C.	Sept., Dec., March	338 E. 26th St.	Adolph Eichhorn, Pearl River N. Y.
Alumni Ass'n U. S. C. V. S.	June	Wash., D. C.	
American Vet. Med. Ass'n	Sept. 5-9, 1921	Denver, Colo.	N. S. Mayo, 4753 Ravenswood Ave., Chicago
Arkansas Veterinary Ass'n			R. M. Gow, Little Rock
B. A. I. Vet. Ass'n of Iowa		Ames, Ia.	F. Jelen, Cedar Rapids, Ia.
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo.	S. Omaha, Neb.	J. V. Giffee, So. Side, Omaha
B. A. I. Vet. Ass'n, Metro. Div		338 E. 26th St.	N. Y.
British Columbia Vet. Ass'n			K. Chester, New Westminster B. C.
California State V. M. Ass'n	June	Fresno	J. P. Bushong, Los Angeles
Central Canada V. Ass'n			A. B. Wickware, Ottawa
Central N. Y. Vet. Med. Ass'n.	June and Nov.	Syracuse	W. B. Switzer, Oswego
Chicago Vet. Society	2d Tu. each mo.	Chicago	A. A. Leibold, Chicago
Colorado State V. M. Ass'n	Jan. 20, 1921	Denver	I. E. Newsom, Ft. Collins
Conestoga Veterinary Club	2d Thur. each mo.	Lancaster, Pa.	H. B. Brady
Connecticut V. M. Ass'n			G. E. Corwin, Hartford
Dominion Vet. Meat Inspectors' Ass'n of Canada	3d Sat. each mo.	Toronto	Wm. Tennant, Toronto
Eastern Iowa Vet. Ass'n		Muscatine	S. E. Houk, Muscatine
Genesee Valley V. M. Ass'n		Rochester	J. H. Taylor, Henrietta, N. Y
Georgia State V. M. A		Athens	W. M. Howell, Valdosta
Hudson Valley V. M. A			W. H. Kelly, Albany
Idaho Ass'n Vet. graduates			C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n		Collinsville, Ill.	L. B. Michael, Collinsville, Il
Illinois State V. M. Ass'n			L. A. Merillat, Chicago
Indiana Veterinary Ass'n			G. H. Roberts, Indianapolis
Iowa Veterinary Ass'n		Ames	H. D. Bergman, Ames
Kansas State V. M. Ass'n			W. J. Guilfoyle, Kansas City
Kentucky V. M. Ass'n		Louisville	H. Gieskemeyer, Fort Thomas
Louisiana V. M. Ass'n			E. I. Smith, Baton Rouge
Maine Vet. Med. Ass'n		Portland	E. E. Russell, Farmington
Massachusetts Vet. Ass'n	Monthly	American House Boston	Harrie W. Peirce, W. Medford
Michigan-Ohio V. M. A	March, 1921	Adrian	W. E. Watson, Metamora, O
Michigan State V. M. Ass'n	Feb. 8-9, 1921	Lansing	Herbert F. Palmer, Brooklyn
Minnesota State V. M. Ass'n	Jan. 13-14, 1921	Minneapolis	C. P. Fitch, St. Paul
Mississippi State V. M. Ass'n	Jan. 25-26, 1921	Canton, Miss.	J. A. Barger, Jackson
Missouri Valley V. Ass'n		Omaha, Neb.	R. F. Bourne, Ft. Collins, Col
Missouri Vet. Med. Ass'n			Chas. D. Folse, Kansas City
Montana State V. M. A		Butte	A. D. Knowles, Missoula
Nat'l Ass'n B. A. I. Veterinarians	Meet with A. V. M. A.		S. J. Walkley, 945 39th St. Milwaukee, Wis.
Neb. Vet. Med. Ass'n		Grand Island	C. J. Norden, Lincoln
Nevada State Vet. Ass'n		Reno	Lewis H. Wright, Reno, Nev.
New Jersey State V. M. Ass'n.		Asbury Park	
New York S. V. M. Society		Ithaca	C. E. Hayden, Ithaca
North Carolina V. M. Ass'n			J. P. Spoon, Burlington
North Dakota V. M. Ass'n	July 13-14		R. S. Amadon, Fargo
North-Western Ohio V. M. A.			C. E. Hershey, Tiffin, O.
Ohio State V. M. Ass'n	Jan. 20-21, 1921	Columbus	R. I. Bernath, Wauseon
Ohio Tri-County Vet. Ass'n			Dr. W. R. Lukens, Hillsboro
Ohio Valley Vet. Med. Ass'n			C. S. Henry, Terre Haute
Oklahoma State V. M. Ass'n	Jan. 11-12, 1921	Oklahoma City	H. Wood Ayers, Okla. City,
Oregon Vet. Med. Ass'n			B. T. Simms, Corvallis, Ore.
Pennsylvania State V. M. A	Jan. 25-26, 1921	Harrisburg	R. M. Staley, Oak Lane
Philadelphia Veterinary Club	4th Tu. each mo.	Philadephia	C. S. Rockwell, 5128 Chestnut St., Phila.
Philippine Vet. Med. Ass'n			A. K. Gomez, Manila
Portland Vet. Med. Ass'n	4th Tu. each mo.	Portland, Ore.	Sam. B. Foster, Portland, Ore.
S. Carolina Ass'n of Veter'ns		Union	B. K. McInnes, Charleston
Schuylkill Valley V. M. A		Reading	C. R. Potteiger, Reading
South Dakota V. M. A			S. W. Allen, Watertown
So. Aux. of Cal. S. V. M. Ass'n.	3d Wed. Dec., Mar., June, Sept.	Los Angeles	J. A. Dell, Los Angeles
Southeastern Michigan V. M. Ass'n	2d Wednesday Jan. Apr. Jul. Oct.		H. Preston Hoskins, Detroit
Southeastern States Vet. Med. Ass'n	Jan. 24-25, 1921	Spartanburg, S. C.	J. I. Handley, Atlanta
Southern Tier V. M. A		Binghamton	R. R. Birch, Ithaca, N.
Southwestern Mich. Vet. Med. Ass'n			L. A. Winter, Eau Claire, Mich.

